Aeronautics (X)

SOUTHERN

Flight

CIVIL AIR PATROL EDITION

JAN 12 1944

Another *Corsair* Victory

Ever since it first saw combat duty with the Marines in the South Pacific, the Vought Corsair has established a fighting record that speaks for itself. Today this fast, tough, hard-hitting fighter is rolling off the lines in ever-increasing quantities.

In recognition of an outstanding production achievement, the Army and Navy have conferred upon Chance Vought Aircraft the Army-Navy "E".

CHANCE VOUGHT AIRCRAFT

STRATFORD, CONNECTICUT

ONE OF THE FOUR DIVISIONS OF UNITED AIRCRAFT CORPORATION

©C1B 612689

DEC 29 1943

Reunion in America

...that's one thing we're working and fighting for!

Christmas furlough, 1943...a little fellow he's never seen...such a lot of living to be crowded into a few precious days, then off again.

Ask this man, *any* man, what he's fighting for.

Ask Joe, who's done "bomb-sight-seeing" over Berlin; or Tom, who found good hunting among the cold rocks on Attu; or Pete, who can tell of bullet-spitting trees on Guadalcanal; or Al, who took his South Seas cruise in a rubber raft.

Yes, they know all the answers.

Conquest?...a New Order? No, it's bigger–and simpler–than that.

It's families and homes and hobbies. It's jobs that can grow with a man's ambitions. It's the right to think, to vote, to worship as a man chooses. It's the heart of America.

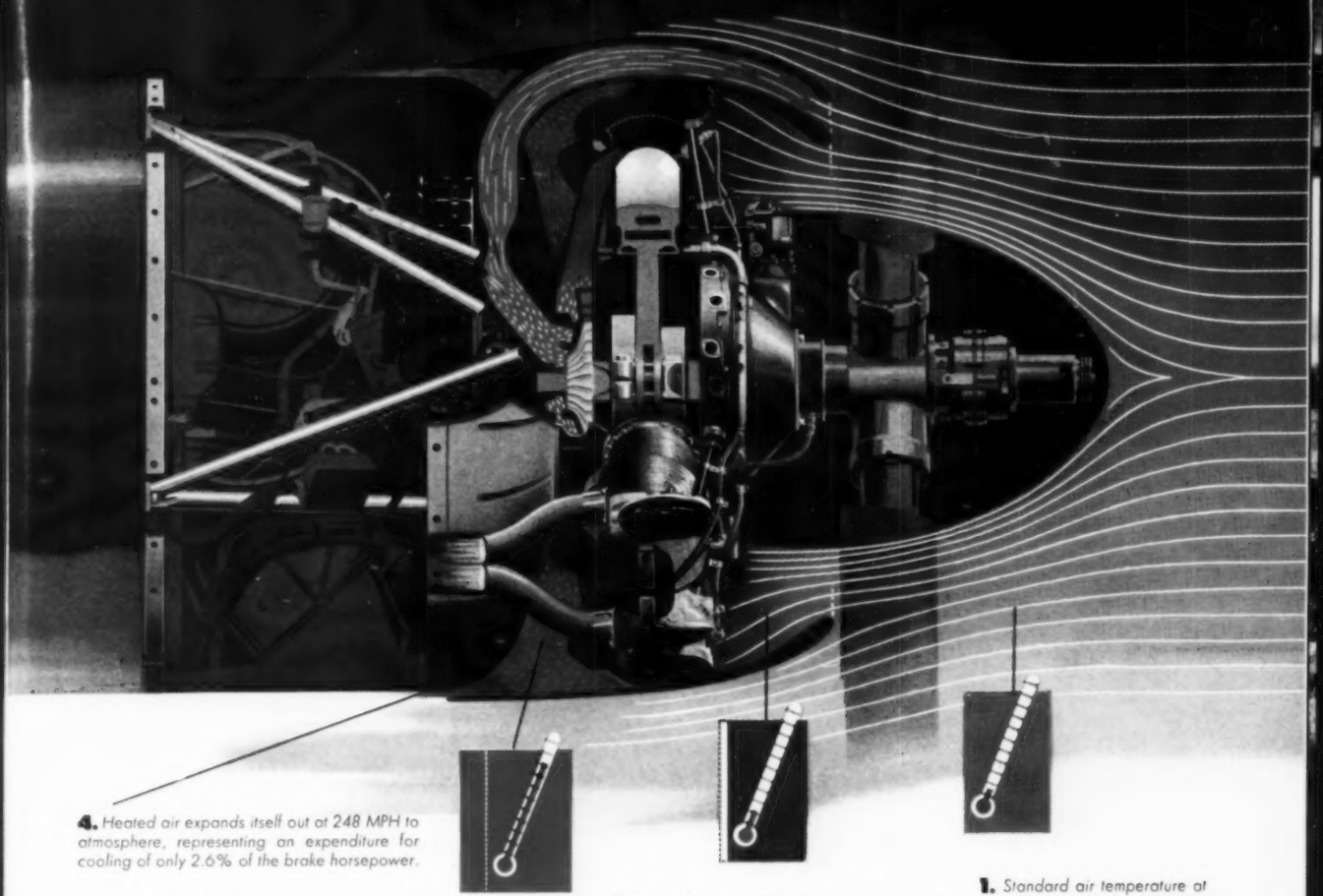
It's what the thousands of men and women of North American Aviation are fighting for, too–fighting for by turning out ever-more and ever-better Mitchell bombers, Mustang fighters and Texan combat trainers... planes to make the job of our fighting men easier, safer ...to bring the men home sooner.

Home–not for Christmas furlough –but for a reunion in America that will have no ending.

North American Aviation, Inc., designers and builders of the B-25 Mitchell bomber, AT-6 Texan combat trainer, P-51 Mustang fighter (A-36 fighter-bomber). Member, Aircraft War Production Council, Inc.

North American Aviation *Sets the Pace!*

WRIGHT POWERS THE TONNAGE OF THE AIR



4. *Heated air expands itself out at 248 MPH to atmosphere, representing an expenditure for cooling of only 2.6% of the brake horsepower.*

3. *In enclosure behind engine, pressure drops to 7.23 lbs./sq.in., even though temperature is raised to 150° F. One pound now occupies 31.0 cu. ft.*

2. *In rated power flight, plane picks up air at 300 MPH. Impact compresses air to 7.49 lbs./sq.in., raises temperature 16°. One pound of air now compressed to occupy 22.8 cu. ft.*

1. *Standard air temperature at altitude of 20,000 ft. is —12° F.; standard air pressure is 6.75 lbs./sq.in. One pound of air occupies a volume of 24.5 cu. ft.*

A Direct Approach to Cooling

All aircraft engines are cooled by air, whether the air passes through a radiator containing intermediate coolant, or passes directly across finned cylinders. Wright Aeronautical has produced both types of engines, and in developing the history-making Cyclone series has advanced the science of direct air cooling to the point where Cyclones produce more power per unit of space and weight than any other powerplant of any type.

Years ago, air cooled engines were mounted in the open, without cowling. While this provided effective cooling under most operating conditions, the resultant drag exacted a high toll from the power available for thrust. Present-day engine powers and aircraft speeds have depended in large measure on two simultaneous developments — increased cylinder finning and scientific cowling.

With each increase in the number and depth of cylinder cooling fins, engine powers have gone up. In ten years, the rating of the Cyclone 9 has been raised 80% without increase in displacement. The latest development in cylinder design, incorporating a forged head with machined fins, permits as much as 15% increase in Cyclone power without adding to the size or weight. Better heat conductivity of the forged metal, plus extra-deep fins, make Cyclones with these new cylinders the easiest of all engines to cool.

Engine cowling, meanwhile, has been refined to the point where it serves as a pump to supply cooling air to the engine and control its return to the slip-stream. In cooling an engine, still air is picked up and swept along momentarily at plane speed, then returned to surrounding air. Unless it is ejected at approximately the speed with which the plane picked it up, the forward velocity which it retains represents a serious loss of energy. The reduced cooling effort required by the Cyclone engine permits reduction of this cooling drag to negligible values in high speed flight, as shown in the illustration above.

Direct air cooling, which requires a minimum of installation weight and few moving parts, is a feature which has long established the Cyclone as an economical source of power. The marked pay load advantage and ease of maintenance means additional revenue dollars for the operator.

★ ★ ★

Wright Cyclones pay their way.

Cyclones and Whirlwinds · Light · Compact · Powerful **WRIGHT** *Aircraft Engines*

GUIBERSON LIGHT WEIGHT DIESEL

POWER

FOR PLANES

Using fuel that will not burn even when exposed to open flame, the Guiberson completely eliminates power plant fire hazard. And every pound of fuel, although it costs only a fraction as much as high octane gasoline, gives 30 per cent greater operating range. For low-cost, dependable operation without fire hazard or radio interference—it's the GUIBERSON.

AMERICA'S RADIAL AIR-COOLED DIESEL ENGINE

Guiberson U. S. A.

GUIBERSON DIESEL ENGINE COMPANY
Dallas, Texas
THE GUIBERSON CORPORATION
Aircraft and Heater Division

ATC
NO. 220

ESTABLISHED 1919

Southern Flight

Tenth Year of Publication
and Faithful Service to the American Aviation Industry

DECEMBER, 1943 VOL. XX, NO. 6

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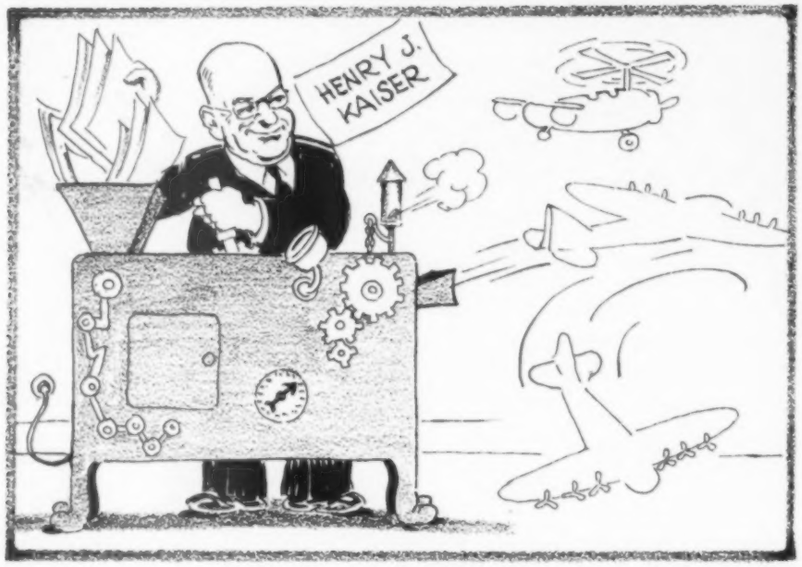
FUEL STRAINERS – AIR CORPS TYPES

Air Associates has the complete range of Aircraft Fuel Strainers in full production. Included are types C-1A, C-2A, C-3, C-3A, C-4, C-4A, C-5, C-5A and various special modifications of these standard types . . . *All are manufactured in accordance with latest revisions of Army and Navy Drawings and to latest manufacturing specifications* . . . Body design permits right or left hand mounting. Drain cocks are provided in the base. Screens, of monel metal, are easily removable for inspection or cleaning . . . Present production schedules permit the acceptance of additional orders for early delivery . . . Inquiries invited.

AIR ASSOCIATES, INC.

TETERBORO, N. J. . . . *BRANCHES:* CHICAGO, DALLAS, LOS ANGELES . . . ENGINEERS & MANUFACTURERS OF AIRCRAFT SPECIALTIES . . . SUPPLIERS OF ALL TYPES OF MATERIALS TO THE INDUSTRY SINCE 1927

JUST AMONG OURSELVES *Editorials and Comment*



WHERE ARE KAISER'S PLANES?

WHEN Henry J. Kaiser arrived in Washington a year ago last July with his proposal to convert nine of his shipyards for the manufacture of flying cargo boats of the Martin Mars type and to reach an annual production rate of 5,000 within ten months, people in the industry were skeptical. Primarily, they questioned whether he had taken into account the tremendous amount of engineering work involved in aircraft production. Even with years of experience in aircraft production, they said, it takes at least two years from design to production.

Today, seventeen months later, has their skepticism been justified? How many of Kaiser's promises have been fulfilled? Let's take a look at the record.

After his first burst of enthusiasm, Kaiser himself was forced last fall to modify his original promises on four scores—the type of airplane he would build, the number he would build, the place he would build them, and the time he would need to get into production.

In July, Kaiser had talked about production of 5,000 70-ton Mars flying boats and immediate engineering on a 200-ton super ship. In August he received letters authorizing him to submit engineering plans and data on facilities and materials for the manufacture of 500 Mars boats. Meanwhile, Undersecretary of War Robert Patterson had suggested that Kaiser build the smaller Curtiss Commando, a plane already in production. But Kaiser, with no aeronautical engineering experience, wanted to concentrate on something newer and bigger. After teaming up with Howard Hughes on August 23, he finally settled for a contract for three experimental 14-ton Duramold cargo planes of a Hughes design.

To build these planes Kaiser soon discovered that his shipyard facilities were inadequate. Abandoning his ideas of shipyard conversion, he moved his aeronautical projects into the Hughes Aircraft Company at Culver City, California, and obtained an $18,000,000 DPC contract to build the planes there. A huge wooden assembly building was then started but was not completed until late last summer, when production facilities were finally moved in.

Originally Kaiser had declared that his engineering staff and preliminary plans were ready and that he could produce the first plane within nine to ten months. After basking under the sobering influence of Hughes, however, he revised his timetable somewhat, declaring on September 18 (1942) that he would need fifteen months for the first plane, eighteen months for the second and twenty months for the third. According to this schedule, the first plane was to be completed by November 15 of this year.

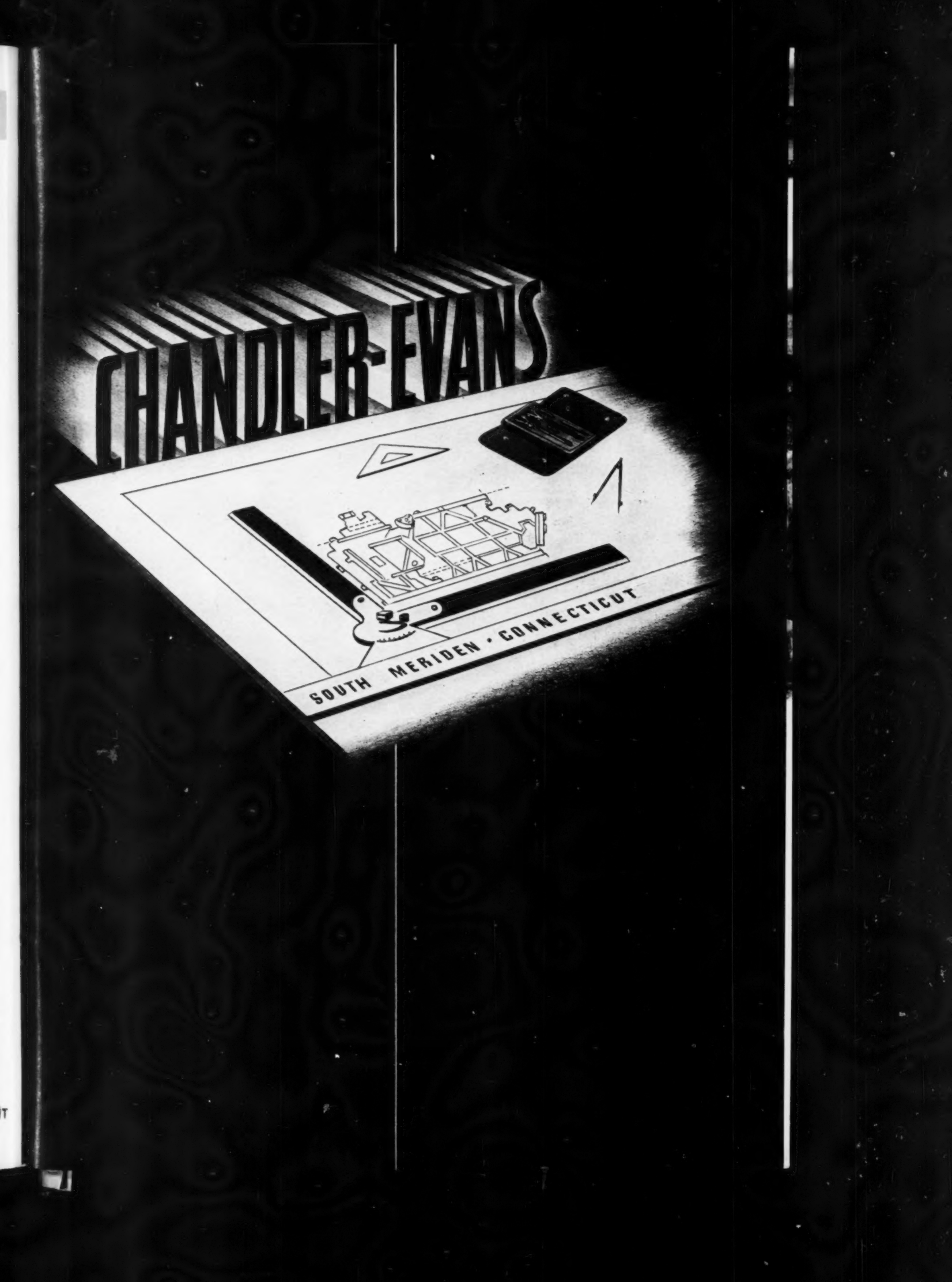
Yet even this date was too optimistic. A year slipped by, and aircraft production did not turn out to be the snap that Kaiser had anticipated. Another revision in schedule was announced, but this time no new dates were given. Where is the first Kaiser-Hughes cargo ship? Hughes now says it should be ready to fly late in 1944.

Even after a winter of headaches with his cargo project, Kaiser still remained blind not only to the difficulties involved in building aircraft engines, but also to the engineering required in designing them. On April 6 he burst into headlines again, this time with a proposal to build a cargo plane of the flying wing type, with a 282-foot wing span and with no tail. Speaking in Portland, Oregon, he said the plane would weigh 175,000 pounds fully loaded, of which 55 per cent would represent useful load. Carrying only fuel, it could fly 17,000 miles non-stop, he claimed, while loaded with fuel and bombs, it could bomb Tokyo and return.

To power this super super ship, which he announced his engineers were already creating on the drafting boards, he planned to use four 8,000-horsepower engines. But who was designing the engines? At that time the most powerful engine in production was the 2,000-horsepower Pratt & Whitney Double Wasp, used in the single-engine Thunderbolt and Corsair and the twin-engine Commando and Ventura. Even the new Wright engine used in the B-29 super bomber, while over 2,000-horsepower, is still far from the 8,000-horsepower required by Kaiser.

Rushing headlong into still another aeronautical field, Kaiser announced on April 29 that he had contracted with Cargoes, Inc., a subsidiary of the Lend-Lease Administration, to build two helicopters for the British government, which were to be capable of taking off from merchant ships to combat submarines preying on convoys. The helicopters were to be built at Fleetwings, Inc., the aircraft plant at Bristol, Pa., which Kaiser took over last winter, and were to be ready within ninety days or less. Fifty engineers were working on the helicopters, to be modeled on the experimental Sikorsky helicopter, and the engineering was "well along".

July 29 came and went—but no news of Kaiser helicopters flying. Finally, a month later, came the announcement that Machine & Tool Designing Co., Inc., had completed the design of a helicopter for Kaiser. But still—where are the helicopters?


CHANDLER-EVANS
SOUTH MERIDEN · CONNECTICUT

The Birdmen's Perch

From Xmas
FROM FLUTTER and MAJOR AL WILLIAMS
alias, "Tattered Wing Tips," Gulf Aviation Products Manager, Gulf Bldg., Pittsburgh, Pa.
Too!

UNTOLD STORY . . .

WE'VE NEVER told you about the dozens of tests that Gulfpride Oil is subjected to in our laboratories. They deal with viscosity, gravity, pour point, flash point, fire point, carbon residue, and a whole list of others.

The reason we've not mentioned these tests is that we figured you'd be more interested in *what Gulfpride does in your engine*, than in what it does in our test tubes.

And if you've used Gulfpride, you know that it forms less carbon and less sludge under the cruelest operating conditions. You know that it gives your engine an extra margin of lubrication protection for longer periods of time . . . the reason, of course, being the special Alchlor Process which extracts more of the carbon-forming-sludge-making elements from Gulfpride.

Now, these characteristics of Gulfpride are exactly the same ones that we confirm in our laboratory tests.

And there's the point . . . why should we waste time telling you what we

find in the laboratory, when you can so easily arrive at the same conclusions by using Gulfpride?

BRAINTWISTER

If three Marine pilots can shoot down three Japs in three minutes, how many Marine pilots would it take to shoot down 100 Japs in 100 minutes?

Sure, we know it sounds simple! But are you *sure* you've got the right answer? If you're not, drop us a postcard. You

might even drop us a Braintwister of your own. But we *won't* use it unless you send the answer! That's final.

DIVERSIFICATION—CHAPTER UMPTEEN

For many years Gulf has worked closely with the construction industry.

We have served contractors with engineering counsel gained from first hand construction experience, as well as with special petroleum products.

We're especially proud that our products and our experience have been utilized in so many military construction jobs. We've pitched in on Army camps, military airports, landing strips, and many other war jobs.

And still are!

Gulf Oil Corporation and Gulf Refining Company...makers of

GULF AVIATION PRODUCTS

OIL IS AMMUNITION—USE IT WISELY

LOWER RADIAL CYLINDERS MAY ACCUMULATE OIL DURING STORAGE. STARTING ENGINE···
IN THIS CASE WILL DAMAGE PISTONS AND RODS. TURN ENGINE OVER BY HAND··
USH!
BEFORE FIRST START OF DAY. IF STORAGE HAS BEEN LENGTHY, DRAIN OIL FROM···
LOWER CYLINDERS BEFORE STARTING WITH THAT GOOD GULF AVIATION GASOLINE
GULF

Upstairs Entrance to Hitler's Fortress

Hitler built himself a European Fortress.

Without airpower, it might have been invulnerable for many, many years. But thanks to airpower, thanks in good measure to the American aircraft industry and the U. S. Army Air Forces, we were invading Hitler's Fortress from the sky a year and more ago.

Allied bombers and fighters roar through the vulnerable upstairs entrance from bases in Britain, Africa, Sicily, Russia...

A single fighter plane of the Red Air Forces has thirty-one little stars painted on its fuselage. Each star represents a German plane shot down. Each Nazi plane destroyed makes it that much easier for our airpower to pour through the upstairs entrance. Thirty-one kills may or may not be a record for a single fighter plane. It's a record we're proud of—because that plane was a cannon bearing Bell Airacobra.

There'll be an "upstairs entrance" to a better world of peaceful travel and commerce. It will take greatly advanced planes, designed for specific jobs. We're used to breaking with precedent in the design and construction of aircraft. We'll welcome new, peacetime assignments. © Bell Aircraft Corporation, Buffalo and Niagara Falls, New York.

BELL *Aircraft*

AIRACOBRAS for victory—future planes for peace

BUY WAR BONDS AND SPEED VICTORY

TO A NEW WORLD OF FLIGHT

The advent of huge numbers of giant troop and cargo ships of the air—with their capacity for swift movement of men, arms and supplies—is altering the entire strategy of war.

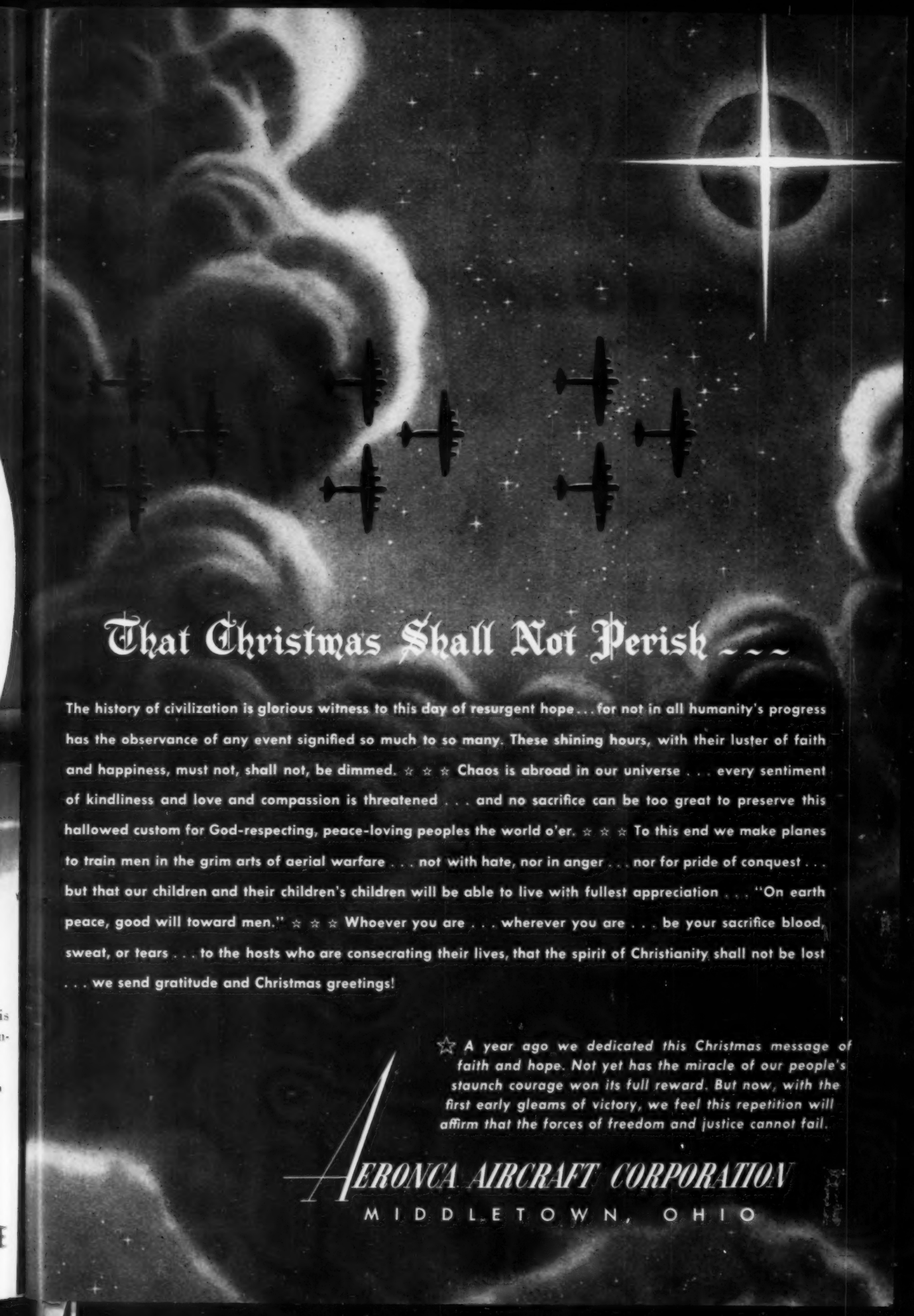
Today they serve to hasten the war's end—but in the world of tomorrow they will blaze new airways of global commerce.

In the forefront of this significant development is Curtiss-Wright, builders of the world's largest twin-engined transport, the Curtiss Commando.

CURTISS-WRIGHT
Corporation
AIRPLANE DIVISION
BUFFALO • COLUMBUS • ST. LOUIS • LOUISVILLE

Member: Aircraft War Production Council, East Coast, Inc.

CURTISS *Commandos* FOR CARGO AND COMMERCE



That Christmas Shall Not Perish ~~~

The history of civilization is glorious witness to this day of resurgent hope . . . for not in all humanity's progress has the observance of any event signified so much to so many. These shining hours, with their luster of faith and happiness, must not, shall not, be dimmed. ☆ ☆ ☆ Chaos is abroad in our universe . . . every sentiment of kindliness and love and compassion is threatened . . . and no sacrifice can be too great to preserve this hallowed custom for God-respecting, peace-loving peoples the world o'er. ☆ ☆ ☆ To this end we make planes to train men in the grim arts of aerial warfare . . . not with hate, nor in anger . . . nor for pride of conquest . . . but that our children and their children's children will be able to live with fullest appreciation . . . "On earth peace, good will toward men." ☆ ☆ ☆ Whoever you are . . . wherever you are . . . be your sacrifice blood, sweat, or tears . . . to the hosts who are consecrating their lives, that the spirit of Christianity shall not be lost . . . we send gratitude and Christmas greetings!

☆ *A year ago we dedicated this Christmas message of faith and hope. Not yet has the miracle of our people's staunch courage won its full reward. But now, with the first early gleams of victory, we feel this repetition will affirm that the forces of freedom and justice cannot fail.*

AERONCA AIRCRAFT CORPORATION

MIDDLETOWN, OHIO

Revving Up

DEBUNKING CONVERSION: The airlines will probably need a few converted military cargo planes immediately after the war, but changing B-17's and B-24's to cargo doesn't make sense. Even the cargo types will have to be charged off in two years, for by that time new types of planes designed for economical commercial use will be available. So says Edward C. Wells, chief engineer at Boeing in charge of design development on the Flying Fortress and its successor, the mammoth B-29.

All military types, including cargo planes, have sacrified much for high performance vital in war, he told the Society of Automotive Engineers in Chicago recently. Converting them would not only be expensive, but CAA safety regulations would have to be modified considerably. By the time that happened the new models would be available and they would conform to CAA safety requirements and incorporate economical and efficiency features the airlines must have to meet competition.

★ ★ ★

IN THE AIR: Head of the Eighth Air Force Thunderbolt fighters in England is 23-year-old Chesley Peterson of Salt Lake City. He's a full Colonel, has nine Germans to his credit, was shot down twice over the Channel, has been in over 130 sorties and wears the Distinguished Service Cross, British Distinguished Flying Cross, Air Medal and Purple Heart. . . . An Army A-20 collided with a bus on a take-off from Love Field in Dallas but kept right on climbing without damage. Its wheels creased a path across the steel dome of the bus, which also continued on its way. . . . A Mustang test pilot tells us the automatic boost of his supercharger kicks the P-51 forward like a swift boot in the pants.

★ ★ ★

TO BE CONTINUED: We've outdone ourselves in this issue and can't resist hogging a little of this precious (considering the paper shortage) space to tout a few points you'll find in our articles. The hottest piece is on page 34 and concerns the B-25's big 75-mm nose cannon. Dutch Kindelberger scored another outstanding "first" with it. . . . We've hungered for raw, hair-raising heroics ever since the AVG was disbanded, which may be why we're biased in voting for "Guerilla Airline," page 32, as the piece de resistance in this issue. The pictures, incidentally, are a rare find — they were shot by Rev. C. L. Sharp of Fort Worth, whose son, Charley, is CNAC operations manager. All honor to the valiant DC-3 warriors who've been taking it from the Japs since 1937 with the kind of spunk Hirohito never knew existed. . . Remember Bill Green's "The Sky's the Limit" statement last month that we aren't mass-producing airplanes yet? Well we're kind of proud to follow it this month on page 40 with an elaboration by Mac Short, Vega's engineering vice president and head of the SAE. "Aviation hasn't expanded," says Mac. "It exploded." . . . Bill scores again this month on page 45 by speaking up for the small airport operators. He speaks a timely warning about municipal planning, which threatens to absorb the little bases into swell-elegant "satellite" airport systems some big towns are sponsoring. Don't let this happen in your city; stick by the fellows who built their own airports and provided a square deal when you needed it most. Bill would like to hear from some of you about this.

★ ★ ★

PACIFIC SUPERIORITY EXPLAINED: Uncle Sam is sending better pilots, especially fighter men, to the Southwest Pacific but Tojo's replacements are getting greener. That's the message brought back to Lt. Gen. Barton K. Yount, commanding the AAF Training Command, by his chief of pilot training, Colonel Edward W. Suarez, from a 36,000-mile tour on which he interviewed several hundred combat pilots and their commanders all the way from Austrailia to Munda via Port Moresby, Dobodura, Buna, Espirito Santos, and Henderson Field.

(Continued on page 18)

—(AAF Photo.)

ARMY AIR FORCES and production line heroes are featured in a weekly Mutual broadcast presented by the Flying Training Command. Left to right around the table above are Pvt. Gordon Fitzgerald, announcer; St. Sgt. William Herring, actor; Lt. Ernest C. Ruiz, guest star; Captain Robert Jennings, producer; Lt. William Holden, narrator, and Corp. Eddie Hallack, actor.

BOMBER ART IN COMBAT ZONES has become famous. Vulgarity has been ordered toned down, but the squadron artists still find plenty of room for full expression of their talents, as witness these Flying Fortress "canvasses" snapped by a Boeing Aircraft Company service representative in the South Pacific.

Progress Report:

Automatic Exit Flap Control

Before Pearl Harbor

Memo to AiResearch Engineers:

Can exit flap control be made automatic? It would give greater freedom to pilots...and cut open-flap time considerably. Thus you can help reduce cooling drag and increase airplane speed.

1941

Many systems being designed and tested in our laboratories. Some problems now licked. New techniques of electrical operation being developed that look like the answer.

War Comes

AiResearch has the first system of Automatic Exit Flap Control tested and proven! Lightweight, simple in design, made of standard aircraft parts, it provides a 25° F. modulation range between flap open and flap closed. Powered by a new type of electrical circuit for high altitude operation, the system goes into service on America's fighting aircraft!

Still AiResearch engineers keep striving to make the best even better...

Now AiResearch Announces Another Advancement: "FLOATING CONTROL"

The improved AiResearch Automatic Exit Flap Control System is based on a new principle of proportionate rate control whereby the thermostat moves the actuator *directly* . . . at a rate in exact proportion to each change in temperature!

With temperature control constant, it further reduces open-flap time and cooling drag. And provides these additional advantages:

A 3°F. modulation range between flap open and closed.
Elimination of all relays and follow-up.
No vibration-sensitive contacts.
Weight-savings up to 20%.
Simplified wiring

Now fully flight-tested and ready for volume production, the new system is available for 24 volt D. C. or 400 cycle A. C. supply on exit flaps for oil coolers, intercoolers and Prestone radiators.

CONSTANTLY, AiResearch engineers are developing better ways to control air, temperature and pressure in high altitudes. If you have such a problem—for today's military aircraft, or tomorrow's commercial airliner–AiResearch offers you engineering assistance.

AiResearch
MANUFACTURING COMPANY
LOS ANGELES • PHOENIX
DIVISION OF THE GARRETT CORPORATION

"Where Controlled Air Does the Job" • Engine Oil Cooling Systems • Engine Air Intercooling Systems
Automatic Exit Flap Control Systems • Supercharger Aftercooling Systems • Engine Coolant Systems

"Peace On Earth..."

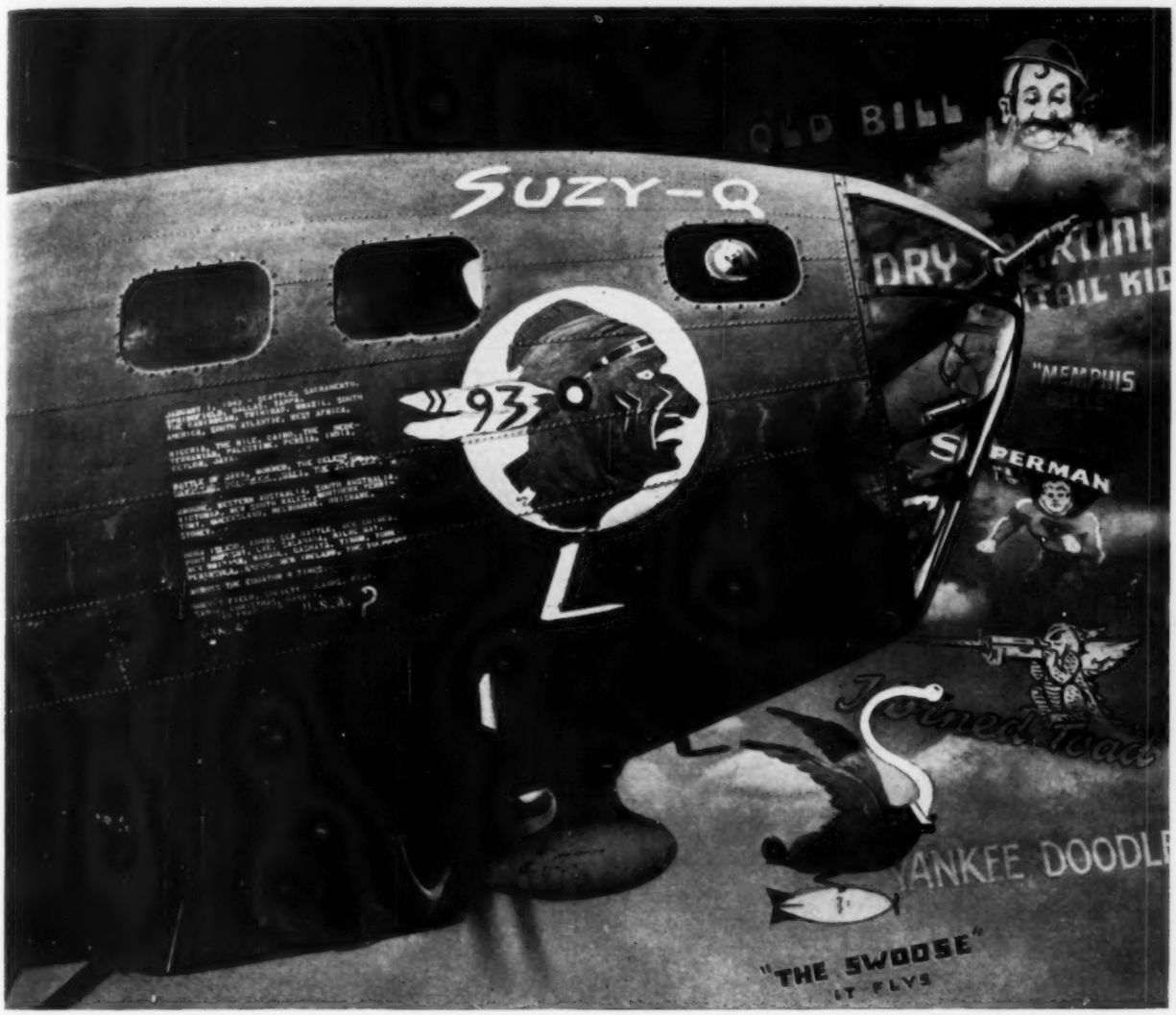
These words will not always be as empty as they may sound this Christmas! One day they will again assume their full significance. And with that day will come all those fruits of peace for which the world now yearns. And just as the 4-plant facilities of The Weatherhead Company helped American industry build products like the car, the airplane and the refrigerator in the past, in tomorrow's world we will be fully prepared to help you build your post-war products.

Look Ahead with

Weatherhead

THE WEATHERHEAD COMPANY, CLEVELAND, OHIO
Manufacturers of vital parts for the automotive, aviation, refrigeration and other key industries.

Plants: Cleveland, Columbia City, Ind., Los Angeles
Canada—St. Thomas, Ontario



Back the Attack — with War Bonds

Affection

As you read story after story about Boeing Flying Fortresses,* one thing is apt to impress you above all else . . . *and that is the deep-rooted affection which Fortress crews have for the sturdy ships which bring them back to their bases, time and again, from fierce battles with the enemy forces.*

Consider the case of the Fortress which fought off half a hundred Nazis for twenty minutes and then limped home with her left wing severely damaged, her inboard engine dead, and more than 2000 bullet holes in her tough hide. At the height of the action the skipper told his crew they could jump. "Sorry, sir," they called back over the interphone, "we're too busy shooting down Focke-Wulfs."

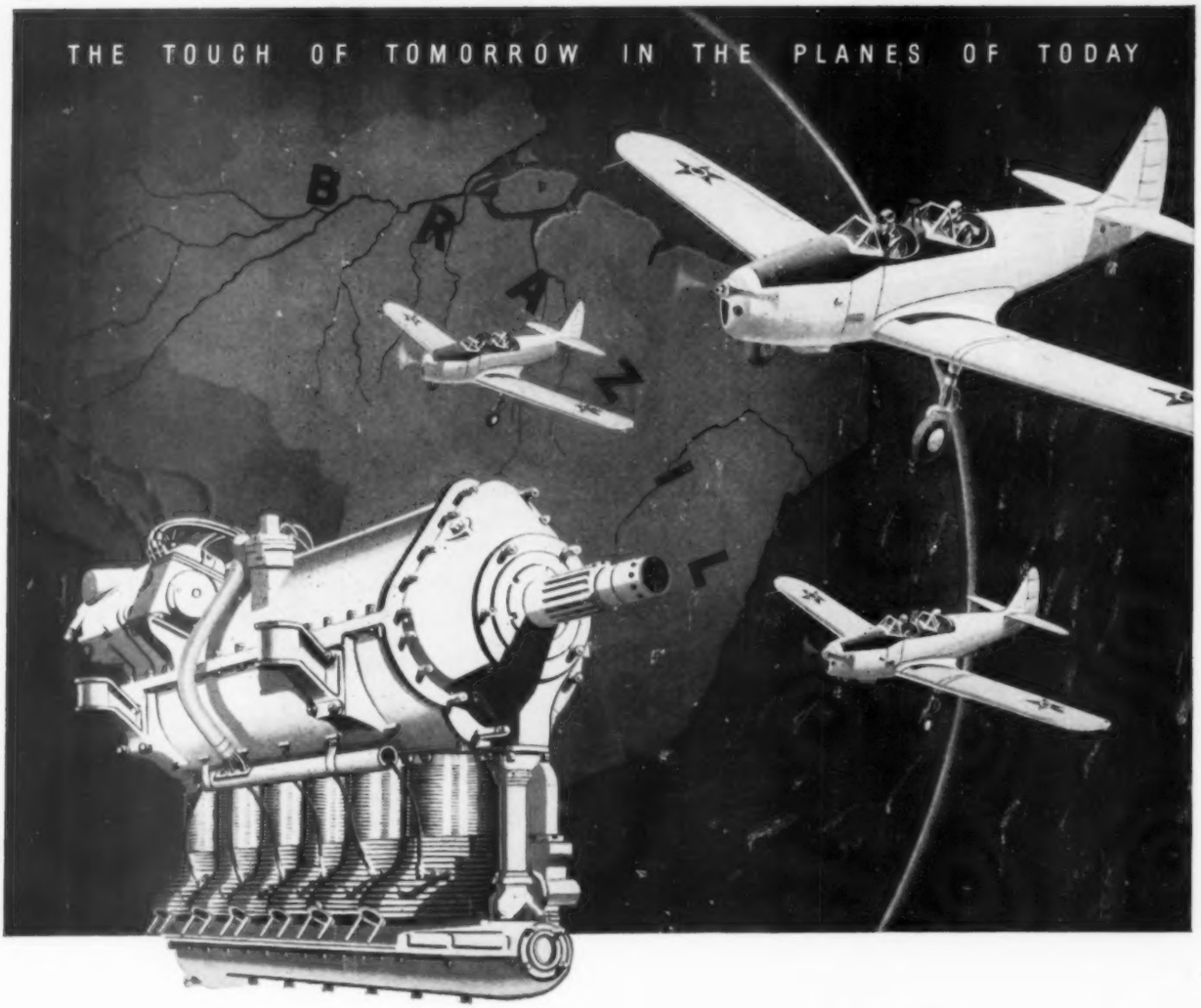
Or this, by another pilot: "We were traveling between 400 and 450 miles an hour. According to the slide rules, there was no chance of our pulling out of the dive. But we were goners if we didn't try. There were tearing noises; the bombs were crashing through the bottom. Then the Fortress came up level, and the wings were still with us! She's a great ship, and you know what I mean when I say GREAT!"

Back of stories like these, and the plane that inspires them, there *must* be designing and engineering and manufacturing skills of high degree. The Boeing engineering staff numbers over 3000 and includes men with experience in more than 25 distinct fields . . . structural, electrical, hydraulic, acoustical, metallurgical and many others.

Boeing products have consistently met or exceeded all claims made for them. True today, it will likewise be true tomorrow . . . if it's "Built by Boeing" it's bound to be good.

DESIGNERS OF THE FLYING FORTRESS • THE STRATOLINER • PAN AMERICAN CLIPPERS **BOEING**

*THE TERMS "FLYING FORTRESS" AND "STRATOLINER" ARE REGISTERED BOEING TRADE-MARKS



More Air Power for another United Nation

The Brazilian Air Force will soon get six-cylinder, inverted, in-line, air-cooled Ranger engines made in Brazil, under a contract recently signed by that good neighbor's Government and the Fairchild Engine and Airplane Corporation.

Brazil-made Rangers, to power its air force's primary trainer, the Fairchild PT-19, will enable Brazil to turn out better pilots than ever in an even shorter space of time.

Ranger-powered PT-19's, with "fighter" characteristics, are ideal for the strenuous course of acrobatics included, today, in practically all United Nations' primary flight training. Unlike the trainers used in the last war, the PT-19 with its Ranger engine, can *safely* do every maneuver in the book: slow rolls, snap rolls, Immelmanns, loops, half rolls, inverted coordination exercises and turns, vertical reversements, spins, and combinations of these. The result —better pilots trained faster.

Brazil-built Rangers will also power Muniz M-9 biplanes and 2-engine Grumman Widgeons currently seeing service in Brazilian coastal patrol, Amazon River patrol and mail delivery. Thus, to the Brazilian Air Arm is added that "touch of tomorrow in the planes of today," which characterizes Fairchild planes and engines everywhere.

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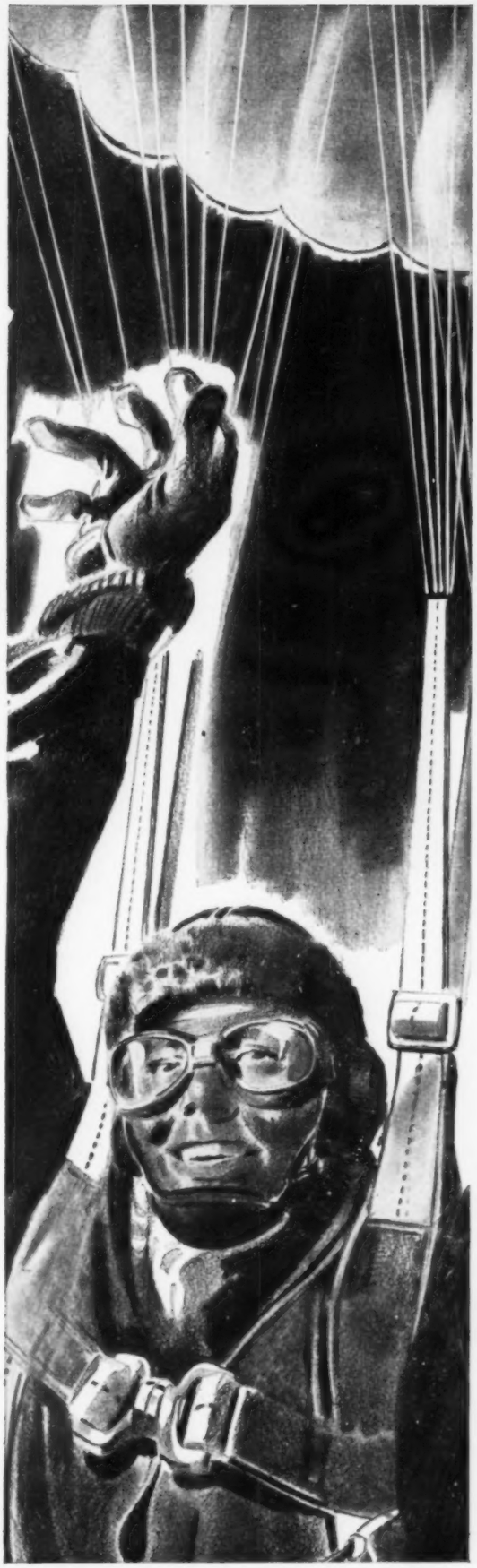

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REVVING UP

(Continued from page 12)

"While I was at one island base our pilots ran into a Japanese concentration and shot down twenty while losing one of their own planes," he told us by way of illustration. "Most of our boys have 400 hours' or more training behind them when they reach the front down there; at the beginning of the war many went straight into combat from school. At that time Jap pilots were at their peak. But today the Jap pilots are getting greener and their calibre is considerably below that of a year ago."

Col. Suarez said AAF pilots in the Southwest Pacific average from forty to eighty hours of operational flying per month, ranging from four-hour missions for fighters to fourteen-hour trips for heavy bombers. "The fighter pilots all praised the P-38," said the Colonel. "They like its speed, maneuverability, visibility and twin-engine dependability. Combat pilots in that area don't operate on the rule of so many missions and then relief, as they do in the European theatre. Down there they get a week's relief after three months of combat and then they go back to the fight. Different outfits have different scoring systems by which potential leaders are graded."

Airports and runways in the South Pacific are A-1 in every respect, he said, and AAF crews were loud in their praise of the Navy's Seabee construction units for their airport construction.

Colonel Suarez' recommendations for pilot training improvements include more high altitude work and emphasis on training pilots to close in tight when rejoining formations and during maneuvers. His tour was one of many by AAF Training Command officers seeking battle-front inspiration for training improvements. He was in the Southwest Pacific combat area from September 29 through November 6, 1943, and witnessed headquarters operations during the Empress Augusta Bay invasion of Bougainville.

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Photograph taken at Sperry Gyro-Compass School

The United Nations go to school

THE OWNERS of those hats are learning about the Sperry Gyro-Compass the practical way. These representatives of the United Nations are seeing it in action in the Sperry Gyro-Compass School.

Many of the men who own those hats will be on convoy duty soon. They already know the risks of submarine warfare and surface contact. They know that lighthouses are dark these perilous nights, that radio beacons are silent, lightships are gone, weather reports no longer available, and even the use of radio communications rigidly limited.

And they know they may sail in prefabricated hulls built under conditions involving immense variation in residual magnetism. Their cargoes may be highly magnetic and their ships almost certain to be equipped with degaussing apparatus to render ineffective the sensitive magnetic mines that lurk in their path.

These factors spell the need of attaining absolute precision in navigation and call for navigation equipment that is impervious to profound and diverse magnetic influences.

That is why these sea-going men are learning about the Sperry Gyro-Compass and why it is more essential than ever in war time. In the course of their study, they learn too that the substitution of electronic circuits* for roller contacts in the follow-up system of the new compass assures even greater reliability with less care and maintenance than before.

When these men pick up their hats for the last time in the Sperry Gyro-Compass School and board their ships, it will be with full knowledge of and confidence in the Sperry Gyro-Compass.

* The Sperry electronic Gyro-Compass is sometimes called the Sperry *Gyrotronic* (registered trade-mark) Compass.

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A Kellett accompanied Admiral Byrd on his voyage to the South Pole.

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ARMY E NAVY

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Note the fluted bottom of an Edo float —an original and patented Edo development. As speed in the water is gained and the float rises on the step, the water is thrown off *at the first flute*. This reduces the wetted area to a minimum and enables the seaplane to break loose readily from the water. Precious seconds are saved in take-off. This action is illustrated in photos Nos. 1 and 2 taken during the tow basin tests of a scale model.

Exhaustive tests of this nature in which the action of wing lift and other actual flight conditions are simulated, accurately disclose the *hydro*dynamic characteristics of a new float model—pitching moment, angle of trim, lift, drag, etc. In wind tunnel tests, *aero*dynamic characteristics are checked with the same scientific thoroughness—see photo No. 3.

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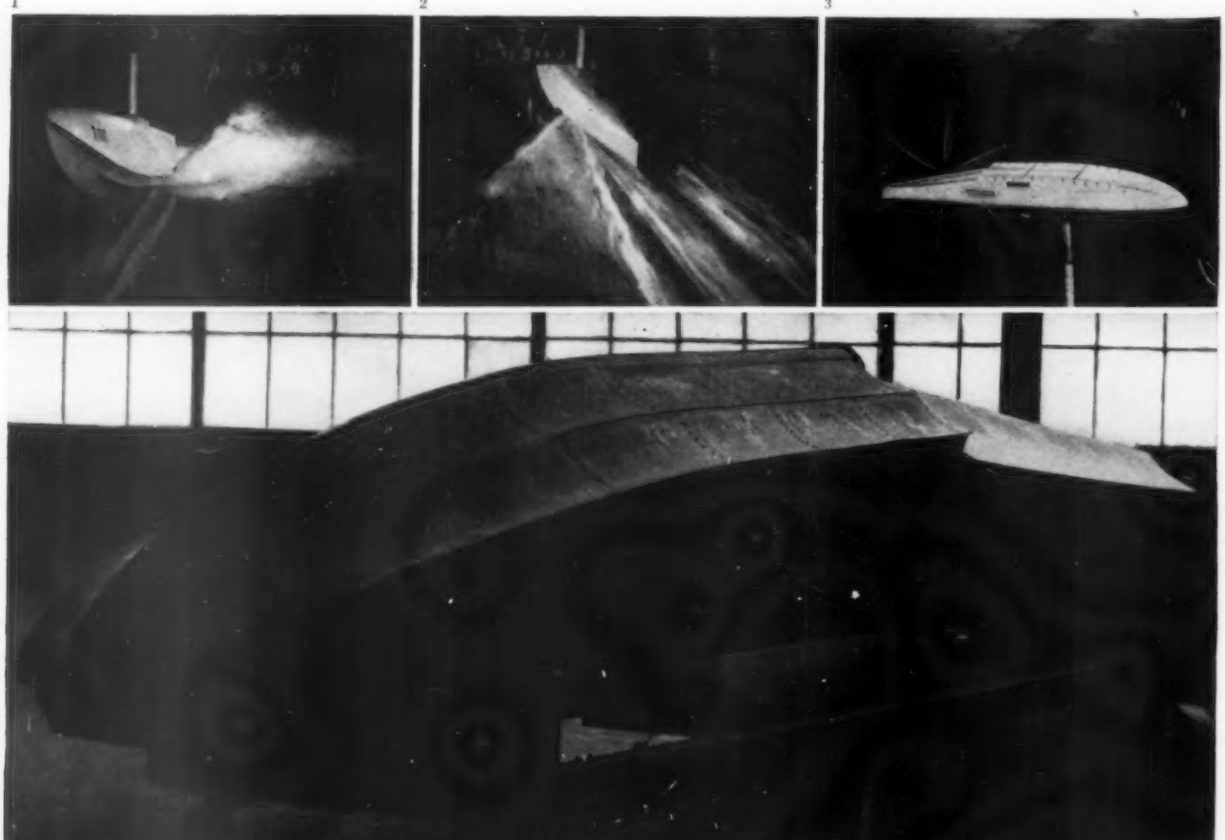

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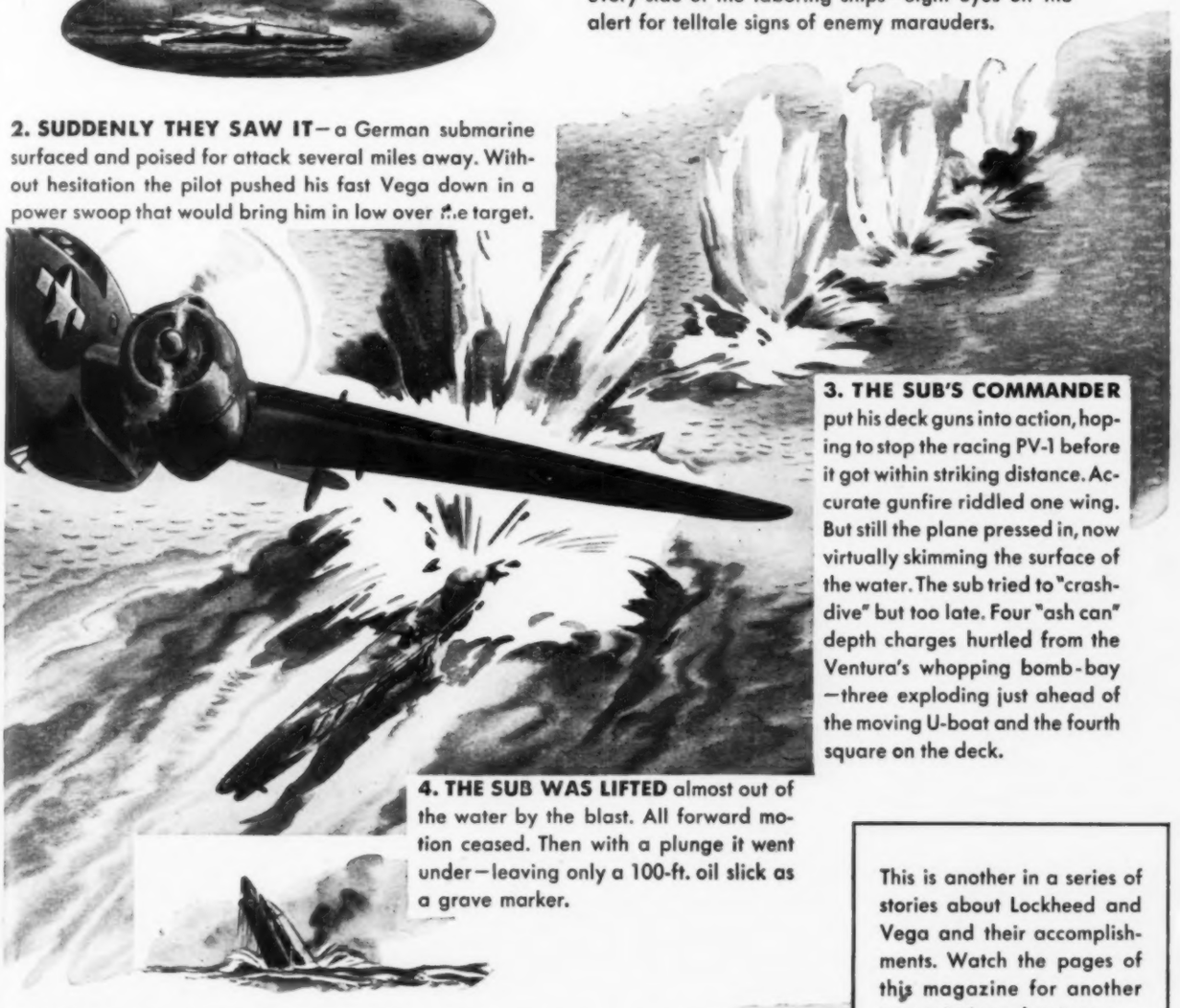
SCORE ONE FOR THE SUB-BUSTER

Navy Pilot Proves Sub-Sinking Abilities of Vega's New PV-1

The PV-1 is the first land-based bomber built for the U. S. Navy. It's a nautical version of the Vega Ventura—a deep-bellied sea rover with extra range for long patrols, reserve speed to pounce on a sub before it can crash-dive, and wallop enough to blast it out of commission. Here's the story of the Navy Ventura's first kill.

1. IT STARTED out as a "routine patrol!" The Navy crew and their plane were to guard a slow-moving Allied convoy against enemy torpedoes. On regular pattern flights they scanned the tossing water on every side of the laboring ships—eight eyes on the alert for telltale signs of enemy marauders.

2. SUDDENLY THEY SAW IT—a German submarine surfaced and poised for attack several miles away. Without hesitation the pilot pushed his fast Vega down in a power swoop that would bring him in low over the target.



3. THE SUB'S COMMANDER put his deck guns into action, hoping to stop the racing PV-1 before it got within striking distance. Accurate gunfire riddled one wing. But still the plane pressed in, now virtually skimming the surface of the water. The sub tried to "crash-dive" but too late. Four "ash can" depth charges hurtled from the Ventura's whopping bomb-bay—three exploding just ahead of the moving U-boat and the fourth square on the deck.

4. THE SUB WAS LIFTED almost out of the water by the blast. All forward motion ceased. Then with a plunge it went under—leaving only a 100-ft. oil slick as a grave marker.

5. "GALLANT—cool—well-executed action," said the Navy of the Ventura's crew. In their hands a dependable airplane had proved itself. Now, with scores of other heroic Navy crews at the controls, rugged PV-1's are in constant service in the United Nations' battle to keep open the supply lanes of the world.

This is another in a series of stories about Lockheed and Vega and their accomplishments. Watch the pages of this magazine for another true aviation adventure.

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Coming in on a Wing... and Douglas dependability

Operating from a U. S. Aircraft Carrier during the invasion of North Africa, an SBD Dauntless Dive Bomber Pilot flew into a tree while strafing an enemy tank. He damaged the propeller, tore the cowling from one side, ripped the leading edge of the left wing at the root and slashed away the outboard end of the right horizontal stabilizer. In spite of this major damage, the plane returned to the carrier and made a perfect landing. Even as that pilot came in on a wing and Douglas dependability, so United Nations flyers throughout the world are safer while doing greater damage to the enemy because of the ruggedness Douglas men and women build into their planes.

PROGRESS REPORT... The 5,000th SBD Dauntless Dive Bomber will have been produced by the Douglas El Segundo Plant in November. On each of two successive recent months production was 45% ahead of schedule!

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★ The Lockheed C-69, called the Constellation, is America's largest, fastest and most powerful land-based cargo or transport airplane.

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AEROLS*

*THE SHOCK ABSORBING UNITS ON AN AIRPLANE'S LANDING GEAR; THE NAME IS DERIVED FROM THE WORDS "AIR" AND "OIL"—THE FLUIDS USED TO DISSIPATE THE LANDING SHOCKS

Rabaul, center of Jap air and naval strength in the Southwest Pacific, has become the most bombed enemy target in the Pacific. But the strongest raid ever staged there was a 350-tonner in which about 300 AAF planes took part, representing every bomber available to MacArthur, who has begged for more planes for a year and a half.

—(Army Air Forces Photo.)

AIR POWER STILL LACKING IN WAR AGAINST JAPAN

Japan lost the offensive six months after Pearl Harbor. But the resultant eighteen-month offensive by the United Nations has lacked air power. The Navy has much aviation, but on land our forces still plead for air strength.

By TOM ASHLEY

THE second anniversary of Pearl Harbor found the United Nations still fighting with meagre air strength along the outer fringes of the Japanese empire. Brilliant victories in the air, on the ground and at sea have been tallied all the way from Attu to the Solomons. But the inadequacy of air strength, except for carrier-based units, reveals an incongruity in the now-hot, now-cold strategy guiding the Pacific struggle.

After two years, the Navy has been more than doubled. Its admirals, particularly proud of their dozens of new carriers and thousands of new planes, have time and again challenged the Imperial Japanese fleet to "come out and fight." The Japs haven't exposed a sizeable naval concentration for many months, and may never choose to "come out" the way the Navy wants them to. But from the headlines one would think the Navy is ready to wade in and sail up to Honshu and knock Tokyo off with a thousand or so Hellcats or Dauntlesses or even twin-engined Mitchells, Jap fleet or no Jap fleet.

Army Air Strength Inadequate

With the Army Air Forces, however the situation is different. Whereas the Navy is at the extreme of having plenty, the Army air units in the Pacific are still begging for strength. Take the Southwest Pacific, for example. In recent weeks the Fifth Army Air Force has been extremely busy rolling the Japs northward. Headlines tell of fifty-ton and seventy-ton raids —small, indeed, compared with European raids. The biggest raid ever staged in that theatre totalled only 350 tons, and it represented heroic efforts because every available bomber took part, including the reserves. All told, about 300 made the raid, which took place on Oct. 12, 1943. There is still paucity of air strength in China. The Fourteenth Army Air Force has an operational zone extending from Formosa, where Jap air bases were recently attacked, along the coast to Hong Kong, Indo-China and around to the "rice bowl" of Central China where ground support is given Chinese infantry opposing invading Japanese armies. Here again a 350-ton raid would be an historical event.

It may be that the High Command, which long ago gave priority to the European theatre, has not decided just how far McArthur's drive shall proceed north from Australia. He has repeatedly cited the Philippines as his objective, and island-hopping

—(Army Air Forces Photo.)

Strongest of U. S. Air Forces in Pacific is the 10th in India. Here's a recent target —200-ft. barges on the Irrawaddy River near Mandalay. "Before" (top) and "after" (bottom) shots show deadly accuracy of B-25 Mitchells of the 10th.

WEWAK AIRDROMES HAVE BEEN GRAVEYARD for hundreds of Jap planes bombed and strafed on the ground. Below is a dispersal line at But, showing AAF parachute bombs drifting into poorly made revetments. Note heavy camouflage on plane at bottom.

—(Army Air Forces Photo.)

would take many more months to get him there. Or it may also be that a greater role has been assigned to the Indian theatre, where tremendous concentrations of men and materiel have awaited orders to move against Burma. From India AAF and RAF bombardment units frequently stage 350-ton raids on Jap bases such as Rangoon and Akyab. Everyone in authority apparently has resigned himself to the fact that a new Burma Road will have to be opened into China before the 14th AAF can be expanded. Burma successes, especially along the coast, would lead to a campaign against Java and Malaya, with air power assigned a major role in seeking out and destroying Jap shipping in the Celebes.

But there are other air units in the Pacific which sooner or later will have a part in deciding the course of the war against Japan. They include the Eleventh Air Force in the Aleutians, which has infrequently and lightly raided the Kuriles; the Seventh Air Force in the Territory of Hawaii, which has at times heavily raided various Jap islands including the Marshalls and Gilbert group, and the Thirteenth Air Force, which has cooperated closely with Navy units in attacking Rabaul and other points in the Solomons. These, with the Fourteenth AAF of China, India's Tenth AAF and the Fifth from the New Guinea area, comprise a formidable network of land-based air power. To equip all of them on an all-out scale would be to funnel a great portion of U. S. aircraft production towards Japan. Their chief need is long-range bombers. Our factories by the first of the year are scheduled to turn out 1,000 or more heavy bombers monthly; by the end of 1944 we should have produced a minimum of 20,000 or more heavy bombers in twelve months—enough to stand large-scale operations against Japan as well as Germany.

B-29 Needed for Tokyo, Mukden

In this connection it is worth noting that the new super bombers, such as the Boeing B-29 already announced as being in production, will probably be the victors over Japan — not the more familiar B-17's and B-24's. If that is true—and several factors make it appear true—it will be many more months before we begin striking Tokyo with more than carrier-based aviation. Asia's vast distances, especially from the China coast to Japan, are too great for large-scale Fortress and Liberator raids against Japanese industries in the homeland. Even with B-29's range, which has not been revealed but which is said by General H. H. Arnold to make the B-17 appear as a medium

bomber in comparison, the task will be greater than any yet undertaken. But on the other hand B-17's and B-24's will be needed more and more as time passes to secure the Chinese coast for the offensive against the home islands of Nippon. Availability of Russian air bases for assaulting Japan does not appear likely until the end of the war in Europe.

There is one point which may effect a revision of ideas concerning the vulnerability of Japan to air attack. War industries there are said to be highly concentrated, and much to-do has been made over the "flimsy, wooden construction" of Japanese cities. But little has been said regarding Manchukuo, the vast continental area controlled by the Japanese. Here, in cities as difficult to analyze as Tokyo, are also great industries contributing to the Japanese war effort. And here also are said to be unknown resources in trained men and air forces. It may well be that Mukden will become as widely publicized, through the coming air offensive against Japan, as Hamburg. Only land-based air power can penetrate Manchukuo, and that air power is not yet available in China.

The Routes of Air Power

The Navy and others have indicated the defeat of Japan will be a matter of carrier drives across the Pacific. More than one "expert" has pointed to the broad, central Pacific as the road to victory, with a couple of smaller seaways leading down from the north and up from the southeast of Japan. The air power drives that win, in our opinion, will sweep from China, conquered Manchukuo and victorious Russia, with the Navy's carriers pitching in for all they are worth until and after Japan's land-based aviation has been neutralized by counter-air force tactics. If the B-29 and its successors are anywhere near as powerful as they have been pictured to us, they will far outweigh the mass tonnages available to carrier-based tacticians. Two super Fortresses should drop more tonnage on Tokyo than the total dropped by Doolittle's fifteen B-25's. And the B-29, we are reminded, is flying in growing numbers and will be joined by other super types within the year.

Meanwhile, Army Air Forces have taken a heavy toll during the second year of the war against the Nips. At Rabaul alone, over 700 Japanese planes were destroyed within a thirty-day period ending last month. Almost as many were destroyed in the Wewak area of New Guinea. Taking part in these victories were B-24's, B-25's, P-38's, P-47's, P-40's and P-39's. Navy and Marine units operating with the AAF also took part, and used Corsairs, Hellcats, Wildcats, Dauntlesses, Avengers and B-25's. Army-Navy co-operation has reached a new high, particularly in the assaults against Rabaul. This unity in command was shown by the wording of a communique issued on November 7 by Allied headquarters in the Southwest Pacific. The communique also describes one of the heaviest actions recorded in recent months in that area. It follows:

"Our Air Forces struck at gathering enemy reinforcements at Rabaul. Opening the action, our naval planes from the right wing, consisting of dive bombers, torpedo bombers and fighters, attacked enemy warships in the harbor. Our Army planes from the center, consisting of heavy bombers and fighters escort, later attacked the township and waterfront installations. In the first attack, five heavy cruisers and a light cruiser were struck by both torpedoes and bombs. A sixth heavy cruiser and two destroyers were hit by torpedoes and another light cruiser was hit by bombs.

"One of the heavy cruisers was observed to blow up. The extent of damage on the others could not be observed accurately. In the second attack, eighty-two tons of explosives were concentrated on warehouses and waterfront areas, causing explosions and huge fires near oil and coal wharves. The entire area was blanketed in smoke with flames rising several hundred feet in the air from burning fuel dumps, buildings and supplies piled high near the wharves. A merchant ship tied to a copra wharf was hit and fired. Over seventy enemy fighters intercepted our naval air units. Twenty-four were shot down with twenty-two probably shot down.

"Only twenty enemy planes could be mounted to stop our Army air units. Two of these were shot down and two more probably destroyed. Eight of our naval aircraft did not return to their base and one Army fighter is missing. A number of planes was damaged."

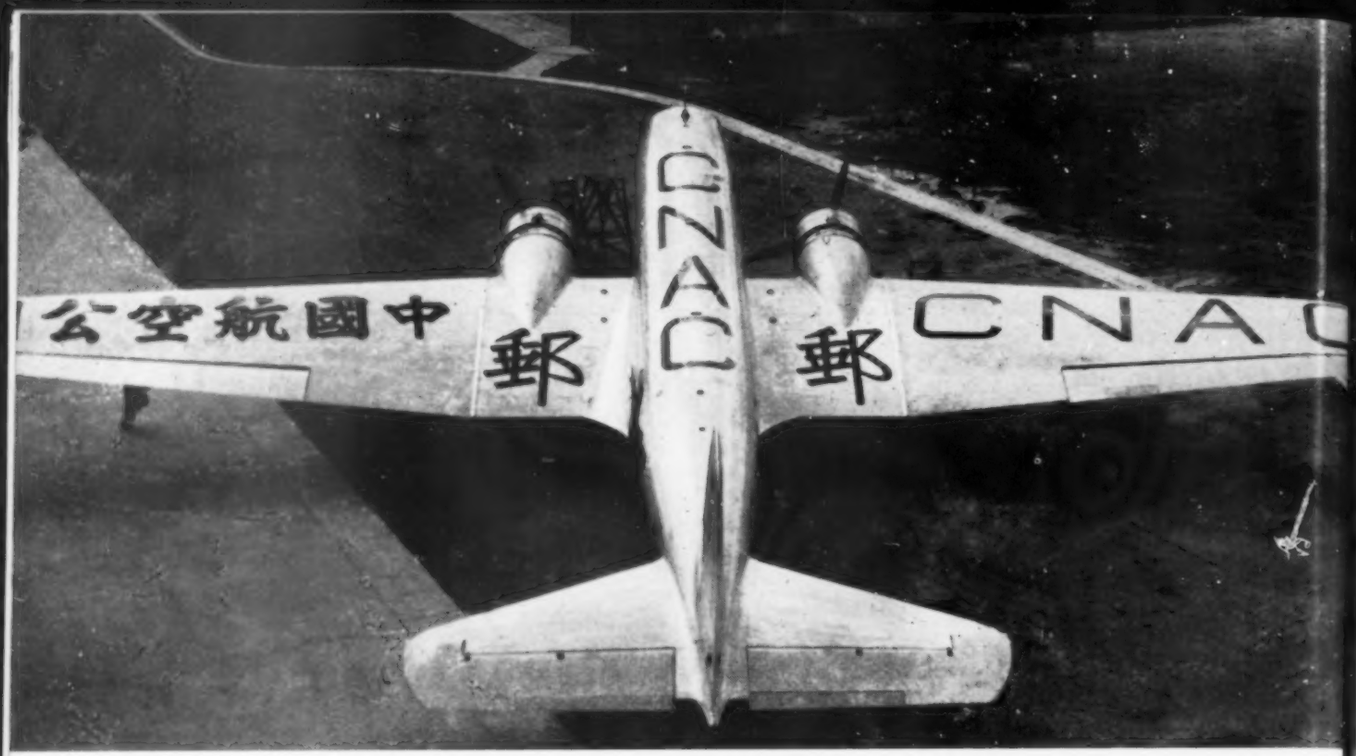
(Army Air Forces Photo.)

AIR BLOCKADE OF JAPS ON NEW GUINEA has greatly aided ground forces pushing north from Lae. Here is one of many Jap freighters under heavy strafing and skip-bombing attack by B-25's. This one approached so low the prop wash ruffled the water (note low tail). Circle in back shows B-25 on water after being downed.

The Record

There have been several outstanding air campaigns in the Southwest Pacific.

(Continued on page 35)



These bold markings identify valiant ships of China National Aviation Corporation. The plane is a Douglas, photographed at Kaitak airport at Hong Kong just before Pearl Harbor. The Chinese labels near the fuselage read "air mail," or "fay you" in Chinese. Those on the port wing, from right to left, are "Chung Qock Kong Hung Kuen Shu," meaning "China Aviation Corporation."

GUERILLA AIRLINE

America's fighting men in China were preceded by a group of unarmed airline pilots who outsmarted the Japs four years before Pearl Harbor. Here's how they did it — and how they survived to chart and operate China's modern aerial life line.

AFTER hell broke loose, we did our best to save the pieces . . ."

William Langhorne Bond, vice president of China National Aviation Corporation, penned these words in his diary and then looked glumly out of the window in his office in Chungking on the morning of December 17, 1941. He was writing up the details of what the sons of the buck-toothed Son of Heaven across the China Sea had done to the Crown Colony at Hong Kong within a few hours of their blitz at Pearl Harbor—with particular reference to what had happened to CNAC.

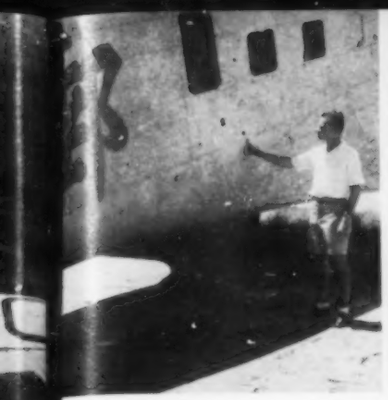
CNAC is China's national airline, an enterprise in which the government and Pan American Airways are partners. Bond didn't have to tell the government what had happened at Hong Kong, because many of its high officials knew at first hand, having been evacuated by CNAC planes under the fire of the invading forces.

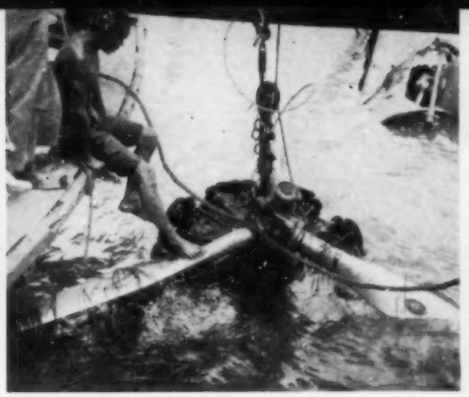
In their inimitable way, the Japs had struck Hong Kong too, without warning. Before Bond or any of CNAC's American personnel could get to Kaitak airport through the network of officious air-raid wardens and nonplussed police sergeants, Pan American's Hong Kong Clipper, two of CNAC's Douglas transports and three Condors had been blasted to bits in the first bombing attack.

Working like troopers, Bond and his Chinese and American confreres pushed the remaining five planes off the field and into a vegetable patch, camouflaged them as best they could before the Japs returned. In the second raid, a 250-pound bomb crashed through the hangar, and scattered all over the floor without exploding. Picric acid, which covered Bond's shoes, hands and clothing, affected his throat and he developed a heavy cough.

What Bond thought was a Charley horse as a result of his exercise in the vegetable patch kept bothering him during the next three days, but he was too busy to give it more than a passing thought. The only way out of Hong Kong was by CNAC's planes and everybody and his brother wanted a ride. He had to direct the salvaging of equipment, the evacuation of important Chinese government personnel. For it was obvious from the first what was going to happen to the Crown Colony. The Japs kept on raiding from the air and within twenty-four hours they had begun to close in on the mainland.

Hong Kong officials blew up what was left of Kaitak airport, except for a 300-foot strip which CNAC used for evacuating the refugees. During the first and second nights after the original attack, CNAC's American and Chinese pilots flew 272 people outside to safety, including Mme. Sun Yat Sen, widow of the founder of the





On August 24, 1938—three years before Pearl Harbor—five Jap Zeros shot down this CNAC Douglas. Capt. Hugh L. Woods of Kansas City, the pilot, points to some of the bullet holes above. He landed on Pearl River, escaped by swimming under water while Zeros strafed and killed thirteen passengers, two crewmen. Divers and salvage barge salvaged the plane.

Chinese Republic; H. H. Kung, China's vice premier and finance minister, and his wife, sister of Mme. Sun and Mme. Chiang Kai-Shek. In all, they carried out more than 400 persons.

War Old Story to CNAC

Back in Chungking to direct operations from there, Bond took his clothes off, started to crawl into bed for the first time in fifty-three hours, and discovered that his "Charley horse" was actually several broken blood vessels in his left leg; now, nearly two weeks later, as he was putting down the details of the Hong Kong attack, he still could not walk on it. Sourly, he summed up:

"All things considered, it was a bad show. CNAC got badly caught. We knew, of course, trouble was coming, and we had plans for evacuation that would have saved more if we had a chance. Orders were out to evacuate our spare DC-3 engines and they would have gone out Monday night (the Japs attacked that morning) as well as a lot of our more important supplies. If you think this sounds like a lousy alibi, I would like you to know I think so, too. . . . One more night and getting the Condor out would have changed the entire picture. . . . Anyway, we are better off than we were in 1937 or in 1938 after Hankow fell . . . "

Shanghai, Nanking, Peiping, Haichow, Hankow, and now Hong Kong, to Bond, an old China hand and one of the driving forces behind CNAC virtually from its beginnings, was getting to be an old story. For a decade, the topside rickshas of the Middle Kingdom Space Machine Family, as the Chinese call the air transports or CNAC, had tangled with the war chariots of the Mikado. It should have been some comfort to him to realize, however, that alone, unarmed and unaided, CNAC so far had always managed to come out with most of its skin.

Intermittently since the Shanghai war in 1932, CNAC had been threatened, shot at, bombed and strafed up and down the coast and over the length and breadth of the country. When its bases were destroyed, CNAC simply built new ones, with runways over rice paddies, maintenance and repair shops in caves in a mountainside. When a transport was shot out of the air or strafed on the ground, CNAC tied the pieces together and brought the ship home again quite literally on a wing and a prayer. When its daytime schedules were interrupted by enemy patrols, CNAC simply took to flying only at night or in weather so foul no Jap would dare venture from the hangar. When air raids raged over the cities on its routes, CNAC sardonically timed departures "fifteen minutes before the second raid;" arrivals, "thirty minutes after the third."

So, even as he was writing the account of the holocaust of the Crown Colony, Bond was making plans for rebuilding, for opening new routes. Thinking of the one DC-3 which escaped unscathed from Hong Kong only to be thoroughly riddled after it was forced down by engine failure at Namyung, he made this entry in the dairy:

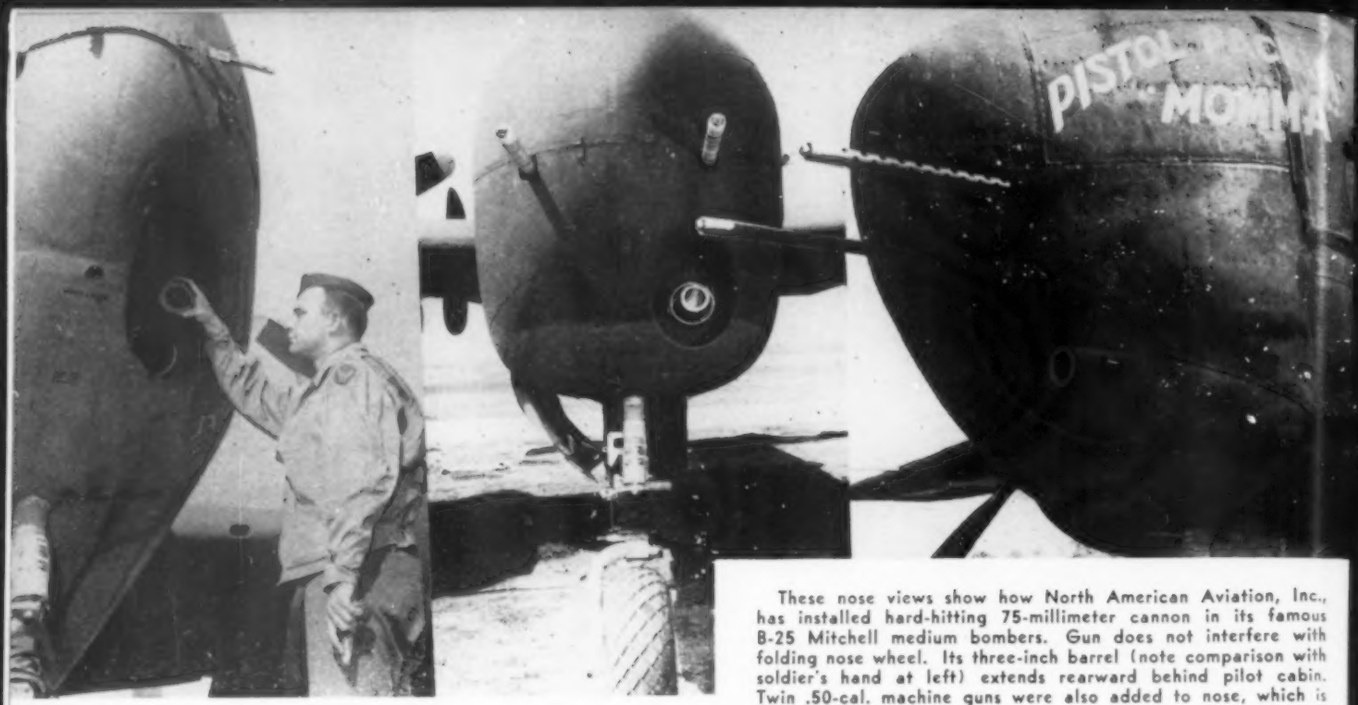
"It will take a long time and lots of parts from the States. I can't even guess when we can get the parts . . . but one of these days we will have it back in service. . . . We are resuming our schedules to the extent of three times per week."

Bond didn't know it then, but the pieces he picked up at Hong Kong were to make CNAC's greatest contributions to the country it serves—and to the war effort of the newly United Nations as well. The Japs were triumphantly on the march not only

(Continued on page 52)

Outer wings dismantled under water, crane lifts fuselage (above). Manager William Bond and Chinese "mayor" are shown below watching salvage.

Douglas was barged to Hong Kong and repaired, flying again in twelve days. These photos made by Dr. C. L. Sharp of Ft. Worth, father of Operations Manager Chuck Sharp of CNAC, shown in shorts aboard barge (below).



—North American Photos.

These nose views show how North American Aviation, Inc., has installed hard-hitting 75-millimeter cannon in its famous B-25 Mitchell medium bombers. Gun does not interfere with folding nose wheel. Its three-inch barrel (note comparison with soldier's hand at left) extends rearward behind pilot cabin. Twin .50-cal. machine guns were also added to nose, which is armor plated.

WINGED ARTILLERY

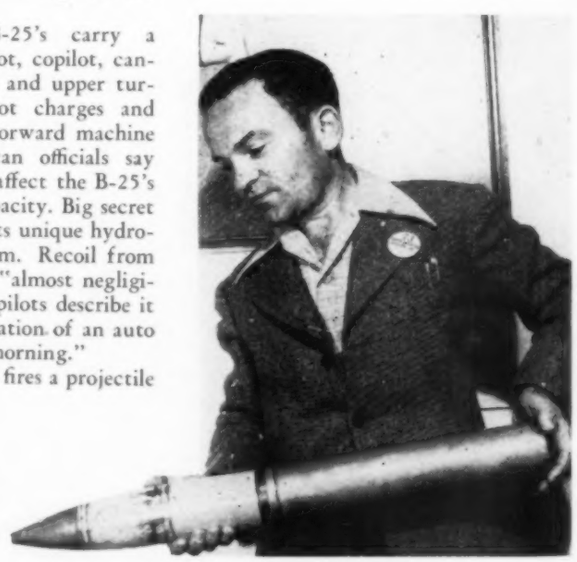
LAST July a B-25 called the "Lil Fox" took off from its New Guinea base to try a new method of Jap killing. Its target was a Jap troop-carrying air transport, and the B-25 caught it just as it was landing on a runway. Swooping for the kill the Mitchell belched heavy flame from its nose and the Jap transport disintegrated. The "Lil Fox" veered and gave a blast at a group of fifteen Jap soldiers scurrying for cover. The single shot tore all of them to shreds. Back at their base, the crew reported the test as successful. Bigger game was selected for the next target — a large Jap destroyer, and "Lil Fox" hit it five times before darkness called off the operation. Returning next morning, the B-25 pumped more rounds into it, after which the warship exploded internally and rolled over (see opposite page).

Those shots were from a 75-millimeter cannon mounted in the nose of the "Lil Fox"—the first American warplane in World War II to mount a gun larger than the 40-mm cannon, which RAF Mustangs have carried. Today all B-25's manufactured by North American Aviation, Inc., at its Inglewood, Calif., plant have 75-mm cannon as standard equipment, and many more are equipped with the heavy cannon at the Kansas City North American factory and modification center. Behind the installation are three months of change-over, 13,551 engineering man-hours and 380 new drawings in redesign.

The cannon necessitated a new and shorter nose structure replacing the glass-enclosed bombardier's cage. Heavy armor plate against frontal fire was installed and it was necessary to relocate the controls from the forward compartment to the pilot's cabin and revise the navigator's station. The result was an increase of 2,000 pounds in the B-25's gross weight. In addition, two .50-cal. machine guns were mounted in the nose.

Cannon-packing B-25's carry a crew consisting of pilot, copilot, cannoneer, radio operator and upper turret gunner. The pilot charges and fires the 75 and the forward machine guns. North American officials say the new guns do not affect the B-25's speed or bomb bay capacity. Big secret behind the cannon is its unique hydrospring recoil mechanism. Recoil from the gun's discharge is "almost negligible," they claim, and pilots describe it as similar to the "vibration of an auto coughing on a cold morning."

The 75-mm cannon fires a projectile having a diameter of about three inches. The shell is twenty-six inches in length and weighs twenty pounds, and the actual projectile weighs fifteen pounds. The B-25 cannon does not fire shrapnel charges, using only high explosives. In a test, three were fired in ten seconds. The range of a 75-mm field gun, as used by ground artillerymen, is about seven or eight miles. The aircraft version has an effective range of "several thousand yards." ★ ★ ★



Here's B-25's huge 26-inch, 20-pound, high explosive shell, held by Jack Fox, NAA field man in New Guinea.

B-25 BLASTS DESTROYER WITH 75-MM CANNON

—(Army Air Forces Photo.)

The big Jap destroyer at left was the first warship to go down before the Army Air Forces' new 75-millimeter aircraft cannon. However, cannon fire alone was not credited with the sinking, as the destroyer was also bombed in the same attack. Top photo shows a B-25 cannon-carrier coming in for the kill. Center photo shows the Jap destroyer exploding internally. At bottom is a close-up of the wreckage, also showing (small circle) a bomb just about to strike the ship, while in the background several Jap crewmen are seen floundering in the water. Note the battered stack, painted with stripes. It was struck by one of a dozen of 75-mm shells. Other wreckage, including the bridge, resulted from cannon fire.

Cannon-firing B-25's have operated for several months in the New Guinea area. One crew reported: "One of these flying cannons pumped shells into a heavy cargo ship off Wewak and blew it right out of the water." Barges, buildings and ack-ack positions have been blown up under a single shot. The "cannonized" Mitchells specialize in hitting ships, gun emplacements, barges, tanks and enemy planes. Their three-inch high explosive shells are effective in blowing up runways. Light tanks are practically turned inside out by a single shell, and narrow bridges, difficult for bombardiers, are blasted sky-high by the projectiles. A 75-mm shell leaves the muzzle with a force of approximately 3,600,000 foot-pounds of energy — enough to lift an object weighing 1,800 tons a distance of one foot, or with enough pushing power theoretically to send a one-pound projectile 680 miles.

Employment of 75-mm B-25's is expected to revise tactics in several ways. Because of the explosive power of the projectiles, combined with their accuracy and low-level delivery, 75's undoubtedly will replace bombs on many targets. They can pock runways more efficiently and knock out small bridges and anti-aircraft guns more effectively than bombs.

WAR AGAINST JAPAN

(Continued from page 31)

Rabaul, about which the aforestated communique was written, was struck by eight heavy raids during the period October 12-November 6, 1943, in which a total of over 700 Jap planes were destroyed on the ground and in the air. During the first five of these raids, in which over 500 enemy planes were destroyed or damaged, only thirteen AAF planes were lost. The same tactics were used against the Wewak area, on a slightly smaller scale. The purpose in each case was to extend the air blockade of Japanese ground forces operating in the North Solomons, New Britain and New Guinea. That this purpose was achieved in the air was proved as Allied ground units continually rolled the Japs farther northward to the open Pacific.

Air tactics have sparked the drive in that area since the Battle of the Coral Sea in May of 1942 turned the Japs back on their heels for the first time after Pearl Harbor. Now history is the effective employment of all forms of air transport, including bombers and small civilian planes, in ferrying men and supplies into Port Moresby and beyond for the Papuan campaign. In June, Army and Navy air strength defeated the Japanese fleet at Midway and thereafter Japan remained on the defensive while in August the Solomons campaign was opened for the beginning in earnest of large-scale Allied offensives in that area. But the fact remains that all of our offensive action has taken place on the outer fringes of the Jap-controlled area, except for the Doolittle raid in April.

The Pacific, from the Aleutians to Rabaul and across to Burma and China, will see greater offensives in the third year of our war against Japan. The Navy predicts big sea battles and carrier raids closer to Japan, the Southwest Command appeals for more bombers for its operations in the direction of the Philippines; the Indian theatre is expected to send expeditions into Burma during the dry season which has four more months to run, and in China the 14th AAF is increasing its operations, as far as supplies permit, against Formosa and the China coast, while the 7th AAF in Hawaii sends its B-24's into ever-widening arcs of raids against widely-scattered Jap islands.

Our commanders in the Orient include the most brilliant air tactician in history—Chennault. Given adequate strength, they will defeat Japan in a minimum of time—with air power far more destructive than that which is annihilating Germany.

Resolutions at Oklahoma City were handled by this committee, composed of (left to right): Seated—J. E. Yonge, George Logan, Ralph J. Hall, Kern Dodge (chairman), Frank Fogarty, Percy McDonald, Fowler Barker and Dr. Ben Wood. Standing—Gill Rob Wilson, Paul Hoheisel, T. E. Braniff, Merrill C. Meigs, Terrell C. Drinkwater and John E. P. Morgan. —(Daily Oklahoman Photo.)

CLINIC SETS PACE

for Aviation Planning

The Lea Bill sparked proceedings when 600 aviation leaders convened at Oklahoma City. Highlights, as presented here, will bring you up to date.

★

By GEORGE E. HADDAWAY

★

FOLKS in aviation who braved the hazards, as well as the discomforts, of ground transportation in order to be on deck when the roll was called at the First National Clinic for Domestic Aviation Planning in Oklahoma City November 11-14, won't soon forget the brilliance of the timely papers presented, the significance of the resolutions adopted and above all, the unparalleled hospitality of the Oklahomans who staged an affair without precedent in the history of aviation conventions. We ought to know —we've been to just about all of them. And if the clinic is to be an annual event, and should our vote go for anything, we'll cast it for Oklahoma City as the permanent location.

About the only affair the clinic could be compared to with reference to such vital convention elements and program planning, time-clock precision for meetings, entertainment and transportation, is Steady Acker's National Air Carnival held annually (before the war) at Birmingham, Ala. So it wasn't a surprise to learn upon arrival at Oklahoma City that the fine and experienced hand of Acker had been at work there, weeks in advance of the opening session. The Oklahoma City Chamber of Commerce, the National Aeronautic Association steering committee for the clinic—and Steady Acker, deserve all credit for domestic aviation's most successful and significant meeting in history.

If there's any fault to be found with the Clinic, and we don't want to get in that position because it was almost perfect, we might complain about too many long speeches and not enough open debate and discussion. However, you can't do everything in three days, and the papers presented should have had all the priority they received. Nevertheless the convention would have been even more fruitful had the scores of delegates and visitors been permitted to get into free and open discussions.

There was some irony. Practically everyone came in by train, bus or auto — a pathetic commentary on what poor planning we must have done in the past and the miserable results of a government policy of stifling rather than expanding air transportation.

We hope there's another clinic next year in order further to solidify the industry and continue the significant work toward building an America that can honestly boast of being "First in the Air." The National Aeronautic Association strengthened itself while strengthening the domestic aviation industry with the Oklahoma City planning conference; and a strong, healthy revitalized NAA is much to be desired not only for the present but in the years to come when an all-inclusive aviation association can do much toward the establishment of aviation growth and development, unhampered by blind and ignorant groundlings on the Potomac who have been in the saddle too long, holding back the only industry in the world that can make as well as maintain the peace.

Stir Over Lea Bill

The resolutions adopted by the clinic delegates do not adequately reflect all that transpired during the three days of brilliant and vigorous discussions covering every phase of postwar domestic aviation. Too long had we been tied down to the fatiguing business of making war and it was re-

freshing to get together again and dig into the realm of plan making and building a sounder, healthier and greater aviation industry for the future.

More than anything else, the Clinic served as an efficient broom that swept the cobwebs from domestic aviation minds — cobwebs that gathered during two years of getting on with the war and nothing else — not even so much as a few days of concerted thinking about what kind of an air world we'll have tomorrow, a pursuit that can only be followed in an old-time rip-'em-up, tear-'em-up aviation meeting like the Oklahoma Clinic fortunately turned out to be.

Without fireworks it wouldn't have been much of a meeting. The pyrotechnics started popping early the first day after a noonday luncheon address by Col. Ed Gorrell, president of the Air Transport Association, trade body for the scheduled airlines. Col. Ed made a stump speech for passage of the Lea Bill, which provided the opening shot for the battles to follow. Afterwards, Director Thomas F. Walsh of the Michigan State Board of Aeronautics seized the floor and challenged Gorrell's attitude, warning passage of the Lea Bill would strangle aviation. Saying he came to the Clinic not representing any airline but simply to do what I can to promote flying," Walsh denied that Federal legislation was the only approach to uniformity in air regulation. "Even now," said the Michigan spokesman, "state regulations are mostly uniform and do not conflict with Federal regulations." He added that uniformity could be further promoted by making it a condition on which allocation of Federal funds for aviation would be based.

Further discussion of differences between proponents and opponents of the Lea Bill was postponed, with a promise that a part of the schedule would be set aside for it. But the upshot of it all was an announcement by Gill Robb Wilson, who was presiding, that "both sides had agreed to table the matter for the present." Thus, as far as the official proceedings were concerned, those who favored the Lea Bill had said their piece, while its opponents were unable to express themselves in a thorough discussion. Not heard, for example, were those who would disagree with both Gorrell's airlines and Michigan's Walsh—those whose chief complaint is that regulations, whether state or Federal, can go too far and thus discourage, rather than encourage, the expansion of all phases of aviation. These and others had to air their views in the corridors and hotel rooms. By the time the clinic got around to resolutions, the Lea Bill was too hot to handle and no stand on it was taken by the clinic.

Later, Roy A. Watkins, executive vice president and general manager of the Howard Aircraft Corporation of Chicago, said, "Some of the delegates feel it is absolutely necessary to get a severance from the air transport group so the future of the nation's industry can be assured by the adoption of a different type of program than will be possible under the Lea Bill." Explaining, Watkins added: "Perhaps we did a poor job in presenting our case, and if we did, the reason was lack of organization and contact to get down to business on our own particular problems. We have got to discard the idea of dumping all aviation into one basket, which is just about parallel to putting Buick and Chrysler under the Interstate Commerce Commission because the Santa Fe and Pennsylvania railroads are there. This also applies to charter plane owners, operators and their related groups upon whom the small aircraft industry must rely for a major

(Continued on page 56)

SECRETARY FOR AIR URGED

Highlights of resolutions winding up the First National Clinic of Domestic Aviation Planning at Oklahoma City were (1) a request for the immediate establishment of a "secretary of national defense" with three under-secretaries for Army, Navy and Air Forces, and (2) failure of the Clinic to take a stand for or against the Lea Bill to extend Federal control over aviation.

A separate Air Force had been proposed, but the cabinet post of secretary of defense was inserted in an amendment to the resolution, which pointed out that air power has "so amply and fully demonstrated its worth that we can no longer deny our Air Forces full authority."

States' rights were voiced early in the proceedings at the clinic, and when the time for resolving, Chairman Gill Robb Wilson announced both sides had agreed that the clinic would take no stand on the Lea Bill. Meeting separately, directors of the National Aeronautic Association went on record against the bill as it then stood and named a committee to specify NAA's objections, while members of the National Association of State Aviation Officials condemned the Lea Bill for ignoring states' rights.

Other resolutions — twelve in all were adopted — recommended:

Immediate extension of scheduled air transport to smaller cities and towns, adoption of a national system of air parcel post and earmarking of air postal revenues for air service extension.

Continuation of CAA War Training Service and extension beyond June 30, 1944, the Civilian Pilot Training Act of 1939, as amended.

Preservation of private ownership and management of air services under reasonable regulated competition.

Expansion of Federal, state and local construction of airports for personal aircraft and simplification of regulations governing personal aircraft.

Immediate revision, insofar as consistent with national defense, of regulations requiring twenty-four-hour guard at airports.

Co-operation of both state and Federal authorities in state airport programs.

Continuance and expansion of intensive research by both government and private enterprise in all aspects of aviation.

Disposal after the war of surplus aviation equipment by an appropriate U. S. agency in such a manner as to protect taxpayers from unnecessary loss, the consumer from unreasonable prices, labor from unemployment and manufacturers and other interested businesses from destructive competition at home and abroad.

Establishment by Congress of uniform procedure for termination and renegotiation of war contracts.

Creation by the clinic of standing committee on aviation education to co-operate with existing agencies and institutions in encouraging, extending and implementing aviation education in all organized schools and school systems of the nation.

Expression of appreciation for success and courtesies of the clinic to Gov. Robert S. Kerr of Oklahoma, Mayor R. A. Hefner of Oklahoma City, City Manager H. E. Bailey, C. of C. Manager Stanley Draper and his staff and associates; Steadham Acker of Birmingham, who worked tirelessly on the program; General Chairman O. M. Mosier, President Gill Robb Wilson and the NAA; and others working with the clinic, including the Oklahoma Civil Air Patrol, War Council Drivers Corps, Air Scouts, Highway Patrol, Auxiliary Highway Patrol, Oklahoma Times and Daily Oklahoman, and the secretarial staffs.

Heavy seas too perilous for average flying boats don't faze the Navy's huge Martin Mars. She's shown here taxiing in Chesapeake Bay with 141,000 pounds gross weight for recent test flights. Her four motors are Wright's latest "super" 2,200-hp Cyclones.

Glenn L. Martin Photos.

Mars Aloft 32 Hours

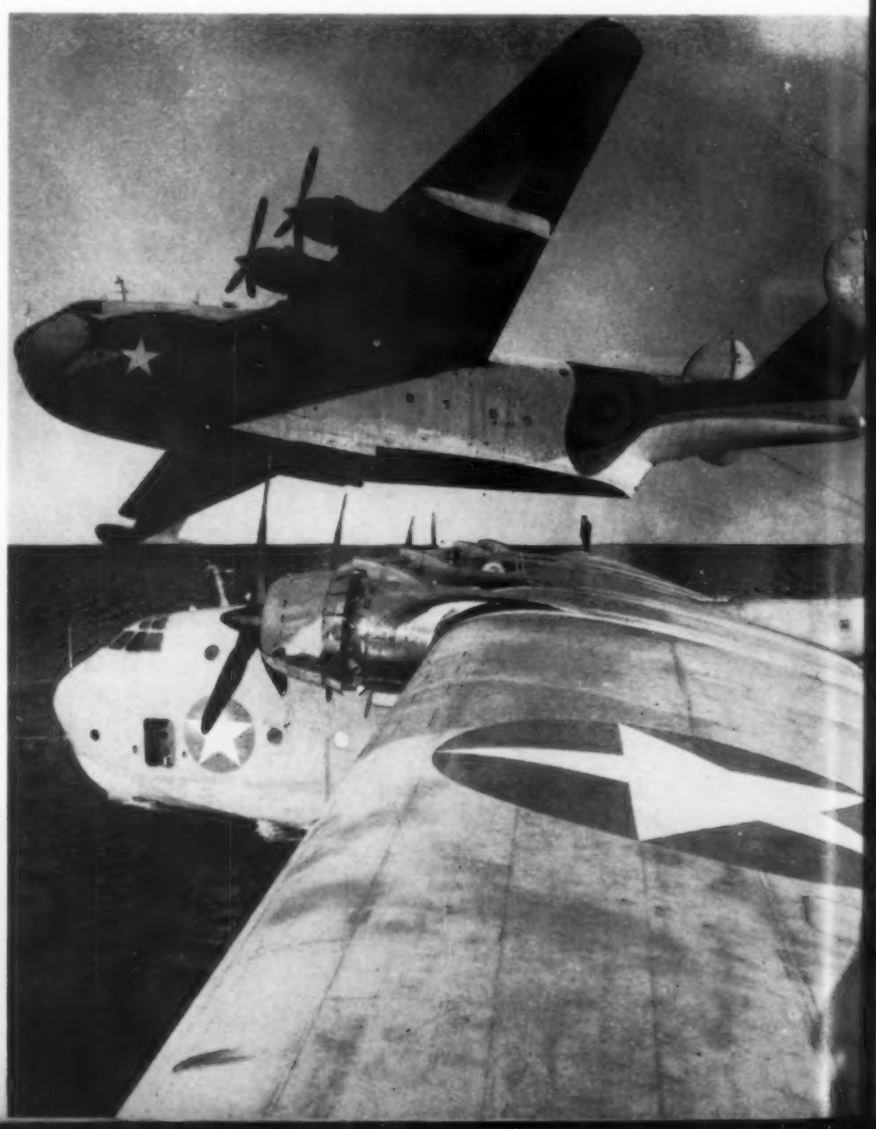
AFTER successfully completing a series of strenuous tests, the mammoth Martin Mars, world's largest flying boat, has gone into Navy transport service as a "flying Liberty ship."

The seventy-ton behemoth's non-stop, non-refueling endurance test consisted of a flight lasting thirty-two hours and seventeen minutes—shattering by 50 per cent the international closed circuit distance record for seaplanes and beating three other official and seven unofficial records. In doing so, the Mars travelled over 4,600 miles non-stop in the vicinity of Baltimore. That flight could have carried it to Berlin and back as far as London. It carried the equivalent of a standard railroad tank car of fuel, about 8,000 gallons, and her gross weight, including the twenty-two-man crew, was 141,000 pounds at take-off.

On another flight test, the Mars demonstrated its twin-engine performance by climbing with two of its four 2,200-hp Wright Cyclones (both on the same side) cut out and fully feathered.

Structural strength was proved by diving the Mars with power on from an altitude of over 13,000 feet. The Navy asked for dives and pull-outs at 2.7 g's but the big boat's accelerometer registered over three g's in the test —the huge 200-ft. wing withstanding a load of 230 tons, the equivalent of the weight of a Coast Guard cutter.

The Mars has a 117-ft., two-deck hull containing the cubic capacity of a fifteen-room house. Inside are sleeping accommodations for sixteen, a fully-equipped galley and a flight deck so large her captain can pace it as if he were riding a steamer's bridge. Cargo capacity over normal distance is fifteen tons—more than is carried by an ordinary freight car. ★ ★ ★



No camera "stopped" those two propellers at right above. They're fully feathered and dead still as Mars climbs on two starboard motors. (Note hard rudder deflection.) That far away object (lower view) is a man at opposite end of 200-ft. wing.

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AVIATION'S "EXPLOSION"

We're turning out plenty of planes, but we aren't in "mass production." Before you argue the point, read this sober and encouraging review of the situation by Mac Short, one of the ablest aircraftsmen in the business.

By MAC SHORT

HOW frequently have you been asked, "How about this business of airplanes?" Let us examine some of the operating or industrial aspects from an engineering viewpoint —which is generally one of rationalization. From these facts, we may well account for some of the engineering principles and problems existing today in or with the airplane itself.

Don't confuse the following figures and facts with a Chamber of Commerce press release or a page out of a congressional investigation. They are points that are helpful in our rationalization.

Aviation's Explosion

First off, it is my humble opinion that over the past five years the airplane business did not expand; it simply exploded — and pieces fell all over the map of these United States. In 1938 we had what the industrialists might say was a going business. We were meeting our payrolls from the sale of ships — not stock. We were almost making money. There were approximately thirty thousand men employed in the airframe business, exclusive of engines and accessories. They did about $130,000,000 worth of business.

Five years later, or about at the turn of this year, there will be over 1,100,000 men and women in the airframe plants, including their subcontractors. That is a gain of over a million in five years — really, it may be more proper to say that it has only been over a span of about three years — as the slope of the curve of personnel versus years takes a real turn upwards in 1940, the point where the explosion probably started. The combustion pressure went up as the spark of December 7, 1941, set off the charge — and now, as one observer, I would say we are hearing the detonating knock. The lead wasn't added at the right time and you can call the lead by any name you like — such as war manpower, absenteeism, or labor unrest.

This business of building airplanes did explode from about the 44th to 1st in the national volume of business through these past five years. As comparisons are helpful, the motor car and truck business did about a billion, three hundred million in 1938, and its peak year of 1941 did about three billion, seven hundred million — or roughly, about a three-fold increase in dollar volume from 1938 until this peacetime industry switched over to war products.

I said that in 1938 there were about thirty thousand men in the industry, and there were so few women on productive work as to hardly warrant them a percentage standing. Now, however, we have reported 42 per cent women in the airframe industry.

Mac Short, vice president of Vega and president of the Society of Automotive Engineers, reviewed "Aviation's Explosion" at a meeting of the Texas SAE Section. He is shown above at left, while Harold Schwedes, North American Aviation's Texas manager and SAE chairman, listens to a story by John A. A. Warner, SAE general manager.

The spread of the pattern to the industrial centers of the United States when the explosion took place, plus the 42 per cent figure, is of interest to the engineer in a somewhat different manner than to the industrialist. The scatter across the length and breadth of the land and the scatter of production work to men and women workers alike, who were but a few years ago — yes, even a few months ago — doing a line of work, plying a trade, or peddling a product that had not the slightest resemblance to the job they are now doing in this industry — establishes to my mind a basic engineering principle encompassing both design and production.

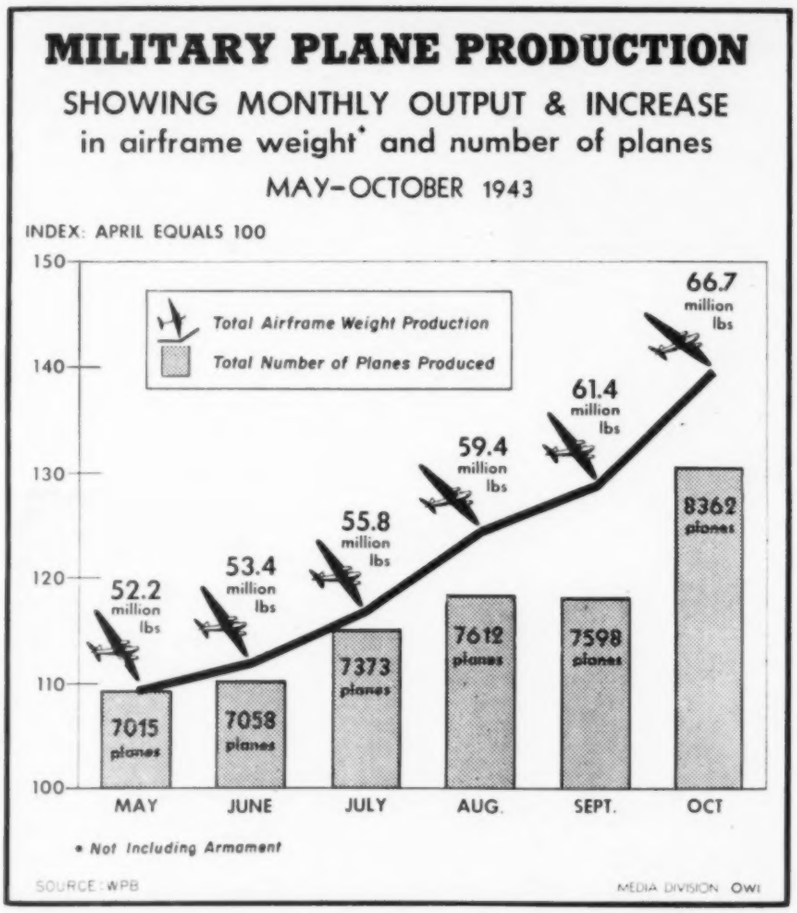
Easy to Build, Hard to Manufacture

I have repeatedly made the statement to some of my associates that this business of building airplanes is easy, but that they are hard to manufacture. This is the principle that I have just referred to.

To build implies making substantially complete units in a single location by bringing many parts to it and installing may others into the complete frame work. It's like building a house.

But, to manufacture implies producing by fabricating parts into assemblies, adding the bits and pieces, and gadgets, in the logical sequence, then flowing them into a line of progression with the completed units coming off the end in a quantity equal to the schedule and without a lot of people swarming around the unit as it nears the end of the line.

To establish proof of this principle is to remind you that five years ago the design was prosecuted by a well established group of men competent in engineering — tooling — fabrication and assembly. They all knew the airplane. They could even splice cables, weld, or if necessary, start the engines. The product was maintained and flown in our armed services by seasoned experts. Changes — if I may use the word here, were the rule and everyone took them as part of the day's work. If it wasn't about as



involved as a new power plant, it wasn't worth beefing about.

This was the situation about five years ago. We designed and tooled airplanes to be built — not manufactured. These are harsh words, and maybe some of you production men would like to take issue with me. But, do you not recall dragging in most of the equipment through a small cabin door in a completely buttoned up fuselage, or other equally as antiquated procedures? But we got along pretty well, as everyone knew his job and many of us knew the other fellow's, also.

Mind you, this is not said to be critical. It was no fault of the designer, the tool man, or the shop superintendent, it was simply the order of the day — the easiest and cheapest way to build airplanes in limited numbers with limited engineering and tooling, limited space, and not the least among them, limited capital.

Along came the war in Europe and the call for American aircraft. You remember the 1938 high for one order for 300 bombers for Britain.

In 1938 we produced, of all military types, something less than 3,800 aircraft. For 1943, we are told by the War Production Board, that this industry will produce in excess of 100,000 units. About a 27-fold increase in numbers alone, not taking into account the relative complexity of change in size and weight through these five years. I ask you if this is not an explosion, rather than expansion of our productive rate.

Airplanes were easy to build by experts. However, they are hard to manufacture, especially with green help. When we exploded, our talent and ingenuity did not expand in proportion. Design, tooling, production methods, and supervision could hardly keep pace, and with all this came the inexperienced shop hand. We did have difficulty getting into production on a manufacturing basis. However, we have since found out why it is hard to manufacture. One must start at the three-view, the grass roots of this problem and plan, and plan, for production.

This you can see at North American or Consolidated, or other aircraft plants. They have re-designed and tooled for production and are able to absorb these many thousands of workers, not mechanics, in making the planes to meet the schedule. Incidentally, superimposed on this manufacturing problem has been the turnover of productive workers, whose action in this regard does not make the problem any easier.

Therefore, I am firmly convinced that this industry has learned how to manufacture aircraft at an unbelievable rate with an equally unbelievable preponderance of green workers, both men and women. Because we have learned how to solve this difficult problem, it seems reasonable that we can now keep up the pace, or even increase the pounds of airframe required per year without increasing the total man-hours to a similar proportion to that which we have just passed through.

The point of all of this is to attempt to prove my principle about building versus manufacturing. Before the designer or production man could do much about getting going in a manner that would satisfy the Sunday supplement writer or the self-appointed production expert, we woke up one bright Sunday morning to learn that we must start to manufacture the hard way in unheard-of quantities — airplanes that were basically designed to be built.

I say there is one question about this business of airplanes that we are rapidly answering: we are manufacturing them through the use of good engineering, good tooling, and good shop procedure. These functions will, in my mind, take the knock out of the manpower problem and we are going to cool down this water jacket of public opinion — at least, about certain phases of this business of producing aircraft.

Well, so much for that philosophy, but as the questions go, how about this business of mass production of airplanes?

Mass Production a Misnomer

Some authorities say we are mass-producing them; but not proposing to pose as an authority, but simply one of the boys — I contend that we are producing them with the masses. Mass production implies many units a day and probably many parts alike in the units — such as 1,000 electric refrigerators a day — 1,000 cars a day. But in this business of airplanes, 'taint so. The productive labor that produces 1,000 units per day might produce ten airframes of the twin-engined bomber class per day.

As for airframe parts and the numbers required per ship — I took a look at the parts requirements cards on our twin-engined bomber line. About fifteen thousand airframe parts, exclu-

(Continued on page 60)

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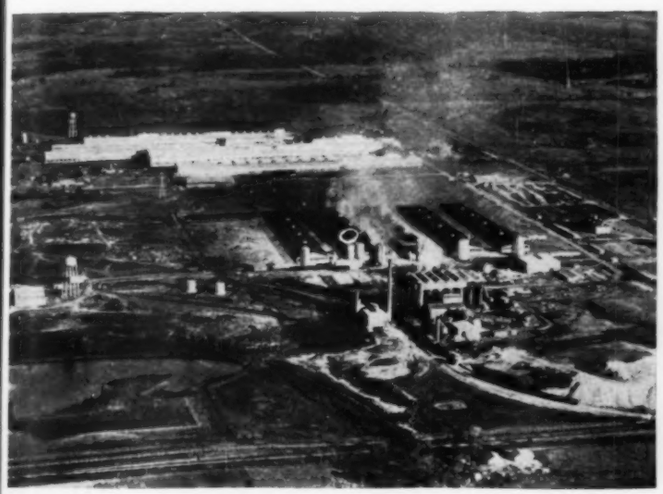
Reynolds Aluminum and finished airplane parts start in this Arkansas bauxite mine. Reynolds mines more bauxite per year than had ever been mined yearly before the war in the United States.



Aerial view of Reynolds plant at Listerhill, Alabama. Here bauxite is refined into alumina; the alumina is reduced into aluminum; and the aluminum is cast, alloyed and fabricated into sheet and rod.

Reynolds rolled aluminum alloy forging stock, tested and Army-Navy inspected, ready to be forged into aircraft propellers.

View of the Reynolds 300,000 sq. ft. expansion of the Parts Division in Louisville. New equipment includes giant 5,000 ton hydraulic press.

THE Sky's the Limit

BY BILL GREEN

Taking issue with an airline president. . . . The tail (356 airliners) would wag the dog (30,000 private airplanes). . . . Big cities threaten standby airports. . . . Let's simplify the rules.

Whoa to the Airlines

THE other evening we chanced to hear a broadcast on a nationwide hookup in which the president of an airline, the president of a railroad, and one Judge Arnold were carrying on a debate as to who should engage in the various kinds of transportation, who had rights, etc.

Much as we are interested in aviation, we got a distinct jolt out of several statements made by the airline president, and we feel that the time has come for us to do a little plain talking about the right for air transport now and after the war.

The airline president said, if we got the gist of his ideas correctly, and we believe we did since Judge Arnold instantly jumped right down his throat, that his idea was that the airlines, or air routes, should be so carefully regulated by the CAA that there would be a minimum of competition in each area and on each route. In the airline president's words, "If there is too much competition, all the carriers will go broke."

In the first place, such a statement is absolutely un-American. Any time we pass laws limiting the competition to such a figure as to permit all the people actually already engaged in the business to make a substantial profit, then we remove all incentive to greater efficiency, we remove all of the rights of other Americans to engage in the same kind of a business because it would reach a peak rather quickly, and we are actually passing class legislation which benefits a few to the detriment of the majority. Such reasoning is illogical, unreasonable and downright immoral.

About twelve years ago, we embarked in our own business at a time when there were five major companies doing the same kind of work we started out to do. Some of these major companies actually wrote articles in the technical magazines deploring the fact that some new outfit (meaning us) was engaging in that particular field and charging less money and in fact it was ruinous because the newcomers would not be able to furnish the service and facilities being furnished by the oldtimers. If there had been a law that we could not engage in that business because there already were enough people to satisfy the demand, then the companies we have built up since that time would have never existed.

Today, however, there are thirty-five major operators in that particular field (oil exploration by geophysical means) and all thirty-five of them have become as large as any one of the original five. The combined companies that we have started up now employ approximately 800 people and have done work all over the world, and are, in fact, now engaged in work in several countries and are supplying equipment used everywhere.

We do not believe that the air routes should be controlled by railroad or by bus lines and to that extent we agree with this airline president. We believe that there should be, however, (within the limits of safety usually prescribed by the CAA) unrestricted competition in the air carrier field.

Some time ago at a meeting of the local aviation planners, we urged that all bidders for small airlines, feeder lines, charter services, etc., be carefully considered and that no bid be rejected simply because an outfit had not previously engaged in airline work, or did not have a million dollars. The local press has shown that some pretty good airlines over the world have been established and run by one man, with one airplane. Who can say that hundreds of new airlines could not be started up tomorrow and run satisfactorily for both the public and the owners thereof, and constitute a tremendous advancement in facilities and service?

We have seen a major airline fly ships day after day from New York to Los Angeles and back without ever having a full load either of passengers, of mail, or of air express. Nevertheless, we have ridden between two of the towns on such a route and have seen buses and trains pick up tremendous loads of local mail, express and passengers.

We know that a great many fine, healthy towns in this country are entirely without airmail, airline service and, in fact, it is not feasible for them to use such service because their mail or express would have to go a considerable portion of its trip (counted in time elapsed) by train, by bus, or other slow means. We believe, therefore, that the people of those towns, realizing that even though a letter comes by airmail, it saves very little time over coming all the way by train, will not spend the extra money for the airmail. On the other hand, if there were prompt, fast pick-up services between those towns and the airline terminals, then we believe that the airlines would require many more airplanes and many more trips per day in order to get their jobs done.

To some extent, although we appreciate what the airlines are doing, and the fact that they do offer a marvelous transportation service, we resent very greatly the attitude that the airlines have exhibited many times in the past to the extent of trying to crowd local private flying from the fields that they use, and trying time after time to get legislation passed which benefited them and hog-tied and hobbled all the rest of aviation.

We have to keep in mind that at the beginning of this war the airlines of this country owned no more than 356, yes, 356 airplanes of all categories. Private flyers, on the other hand, owned something like 30,000 airplanes. It would, therefore, be obvious that any attempts on the part of the airlines to govern all air transport along their own ideas would be a plain case of the tail attempting to

wag the dog. There is too much of that kind of stuff going on in America today, where the majority is controlled by a very small and dominant minority, which time after time has shown that it was demanding things that it didn't even need and weren't good for it.

We think the airlines ought to take their chances in competition exactly like every other business man has. (We know most of them are willing.) The more we all get in there and pitch, the more business we can dig up. This country is big and its resources are unlimited. A little effort and thought on our part will conquer practically any problem and we might as well do it honestly and reasonably.

★ ★ ★

A Point to Remember

At no time do we advocate the government or the municipality going into competition with individual enterprise. We, therefore, would actually prefer that all airports of the future, at least for private business, be run by private business itself.

Anything that would be done in Tulsa or Dallas, or Boston, or Houston, or any other large town, to gather in all the aircraft business to the municipal airport, would inevitably operate to the detriment of many other smaller fields which have been taking care of the public all this time. For Dallas or Oklahoma City to try to gather in all of the local airplane business would practically be sacrilegious in view of the way they have treated the public during the last several years. If it were not for such people as Johnnie Burke, Bob Millsap, Bill Garthoeffner, and others of their ilk, we would be without any landing facilities in a good part of this country. We are certain that the public has been bilked by some municipal agencies, and we see no reason for delivering aviation back into their hands.

No one had to provide municipal or governmental sponsorship for filling stations in this country. When the business justified the filling stations, they sprang up everywhere. It got to where no one worried about running out of gas because at the top of the next hill there was always a gas station. We believe that when airplane traffic justifies it, these same filling stations will provide landing strips adjacent to the highways and will cater to aviation trade. Nobody has to regulate that or sponsor it. It will come when the business justifies it, and if we provide the facilities before the business justifies it, these facilities will either be terrifically expensive or they will go to rack and ruin as many airports did that were built by the government in Oklahoma and Texas several years ago before there was any business to support them. We know that in this country there are several thousand people with money who are considering starting some sort of aviation enterprise once the air is clear again. Let's give those people a chance. Only with competition and free enterprise will we reach our ultimate greatest advancement. This is America. Let it be run by Americans.

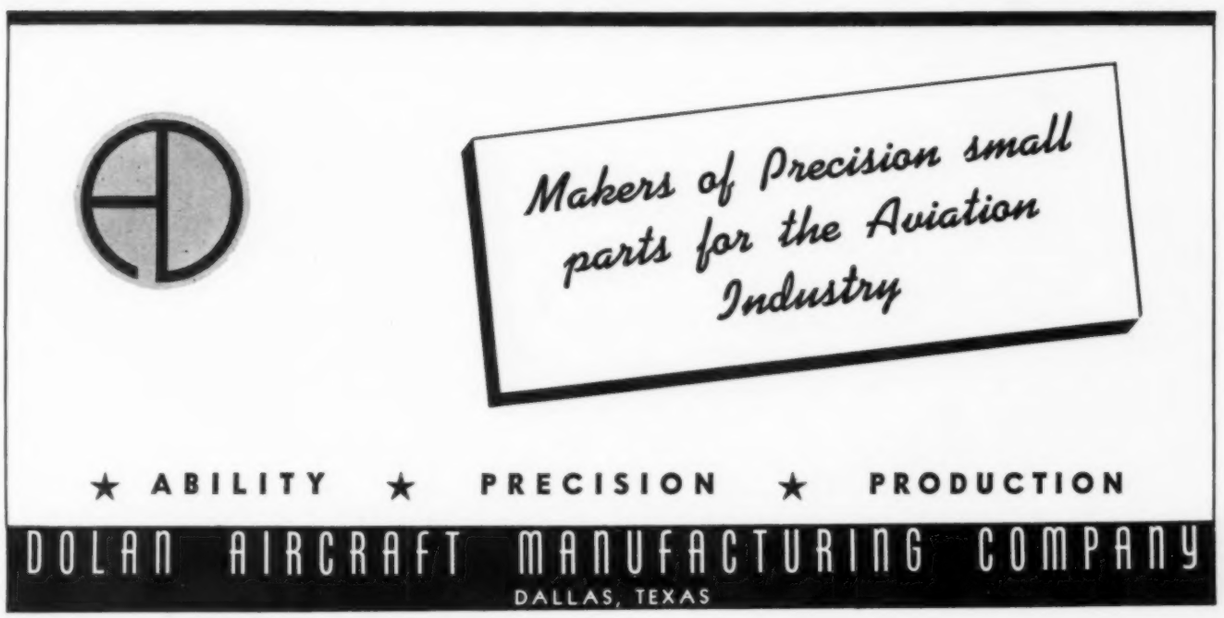
★ ★ ★

Simplified CAA Rules Needed

The other day we had an opportunity to make a little talk at a meeting where Josh Lee, a member of the Civil Aeronautics Board, was also speaking. We were overjoyed to find that one of the speakers present, the leader of one of the largest organizations in this country, took advantage of the opportunity to make the statement for all private flyers, that he hoped the Civil Aeronautics Board would simplify its requirement for aviation of the future so as to permit any reasonably safe and sane people to engage in it.

The CAA in the past has usually been fairly reasonable, but in a number of cases, have promulgated some rather far-reaching and silly regulations which cost the people a great deal of time and do no good whatsoever. We state again that if aviation is to reach its maximum, then it must be as little restrained as is absolutely necessary. We know that some people are going to kill themselves in spite of every regulation there is, and other people wouldn't kill themselves even if there were no regulations at all. We, therefore, think that education is the policy that should be followed rather than rules and regulations. In spite of all the rules and regulations we have ever made, we still have bootlegging, black markets, murder, robbery, graft, and everything else, and it makes no difference how many regulations have been promulgated, the same people keep right on doing the same thing. All the regulations do is embarrass the people who *would not* do those things.

We therefore urge that the air be kept clear, that no unreasonable restrictions be imposed, and especially that free enterprise be permitted to operate in an orderly manner without restraint.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The SEQUENCE

How to Fly It Properly

By GEORGE R. CLAY

PART III

CONCLUSION

Series of Turns

LAST month we left you climbing to 1,500 feet in smooth, right and left ninety-degree climbing turns, keeping your wing tip right on the horizon with the nose in a normal climb. Remember that sloppy flying habits can develop quickly from sloppy climbing turns. Maybe they appear difficult, uninteresting or tedious but they'll help you develop a fine sense of feel as you master the art of keeping your nose and your wing in a constant attitude.

As you climb you remain as near as practicable to the road or section line running with the wind—the same road used for our low sequence work. As we reach 1,500 feet, we should be flying cross-wind, toward the road, if we have used good judgment. A ninety-degree right turn with a thirty-degree bank ought to place us directly into the wind.

We must remember that in this series of turns drift is not a factor and our turns are exactly "on the button." After completing our first turn, we fly straight for a couple of seconds and then execute the same maneuver to the left. This puts us cross-wind again. Holding our heading for a brief second we then execute a 180-degree turn to the right, using a forty-five-degree bank. Again, upon completion, we hold our point until in the opposite direction. When we reach the road we do another 180-degree turn with a forty-five-degree bank, this time to the left. This turn places us cross-wind again so we accomplish a ninety-degree turn to the right with a forty-five-degree bank. This puts us directly into the wind again.

Checking our air speed we should find cruising throttle and cruising speed. If "on the money" we start a 360-degree turn to the left with sixty-degree bank, immediately followed up with the same bank and turn to the right. These two 360's put us up-wind again.

Although it's up to the inspector, and may not be required, here's a good spot to do two 720-degree turns, one to the right and one to the left. By this time the inspector knows whether or not you've had sufficient instruction and practice and in the case of 720's, would be judging your ability as a pilot; for in these turns, the pilot brings into play every ounce of co-ordination and flying skill.

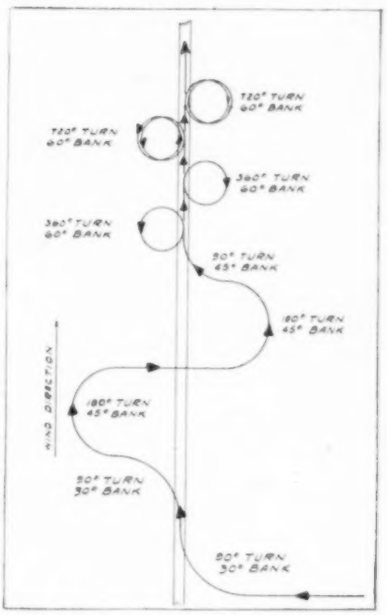
A few hints on 720's—don't get lost in the turns. It's easy to get lost and many pilots have failed their flight tests because of this factor. Watch your road and count your turns —out loud if necessary. Also, don't let the slip-stream "bump" catch you unawares. It is likely to be violent—more so in the 720 than the 360. Keep your stick and rudders firm and expect the "bump" you will certainly get if you hold your altitude correctly.

If you are too steep and are losing altitude, shallow-out with the stick and under no circumstances try to correct your bank with rudder. Remember your elevators, or back-stick, governs the tightness of your turn. It doesn't govern your ball but does contribute to that "good feeling" you get in a good turn.

Don't lose more than 10 per cent of your cruising speed in the turn. If you do, your nose is too high. And don't gain any speed—that means you're diving with not enough back pressure. Remember that all turns of 360 degrees or over are considered acrobatics and that means a parachute is required. Turns with more than forty-five-degree bank shall not be done below 1,500 feet.

The lucky pilots who have lived through two sloppy turns too close to the ground, resulting in crash, are usually most indignant when questioned as to why they had spun in. Practically every mother's son of them will deny he was entering a spin, but that's what happens. Remember you have little to compare your speed to at high altitudes; and the spin you might be happy-go-lucky with at high altitudes becomes a demon of death at low altitudes, particularly under a thousand feet.

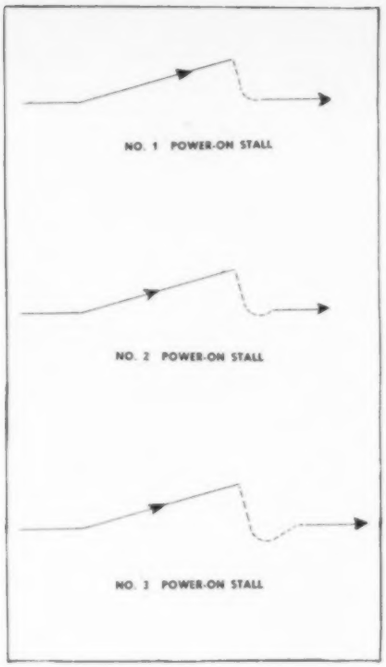
If the inspector is satisfied with your sequence series of turns, it's climbing turns again to 2,000 feet. More than likely we've worked quite a distance from the airport and now is the time to start working towards home.



Series of Stalls

At 2,000 feet we resume our sequence. The new series of stalls, to be distinguished from the type they used to teach, are not pure stalls as we used to think of them, but rather, stall recognition maneuvers. They are among the most valuable of all training maneuvers, yet easy to master. It's an easy matter to stall at take-off or in turns close to the ground and not recover in time to save your neck and airplane; and adequate training in stall recognition practically eliminates the chance of such tragedy because the student knows what's going on before it's too late and corrects automatically. This recognition of the "feel" of a stall is as important, if not more so, than the recovery after the stall is complete.

It's always better to do all your stalls into the wind unless, as pointed out above, you are "working your way" back toward the airport and the inspector gives his permission to stall down-wind or cross-wind — just so he knows *you* know the wind direction. Anyhow, when you're not flying in relation to the ground (as in the low sequence, where work is in relation to the ground) wind direction isn't a factor and stalls can be done in



any direction equally as well as up-wind. The reason why the sequence calls for up-wind stalls is to prove you know at all times the exact wind direction; for an accomplished pilot always knows his wind.

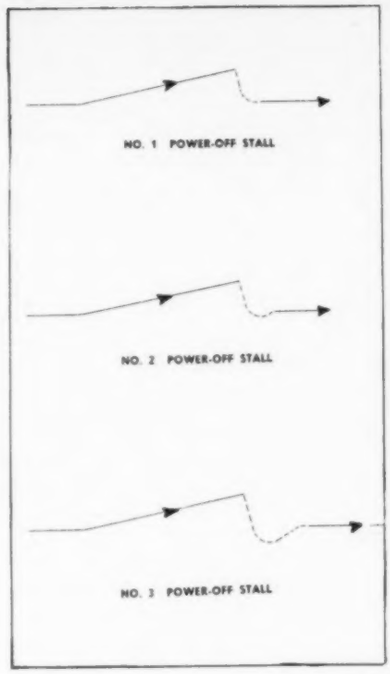
Clear by looking in all directions, then clear the area with a clearing turn, a splendid as well as a useful maneuver in itself and one every student should take delight in performing correctly. The clearing turn is *always* made before any maneuver in which there's to be a change in altitude — before stalls, chandelles, lazy eights, spins and all other similar acrobatic maneuvers. Some students might go into clearing turns before executing power turns or verticals, which immediately gives them away — they anticipate a change of altitude when a change isn't intended, probably reflecting what they've been up to in solo practice.

The clearing turn starts out with a steep turn, nose down to increase speed, throttle at cruising. When the ninety-degree station is reached, roll the plane in the opposite direction, raising the nose simultaneously and increase throttle. This will give you a steep ninety-degree vertical permitting you to clear the area below, making sure another plane isn't working under you. In addition, the maneuver gives you increased altitude, which you need at this point in the sequence. When certain — by observation — your area is clear, you are ready for the number one power-on stall.

No. 1 Power-On Stall. At cruising, or slightly under cruising, we gently pull the nose of the ship just above landing position and hold it there until we feel the burble point has been reached and that another second the stall will take immediate effect. The controls are loose and uncomfortable. The stick will vibrate. At this moment — a split second before the stall sets in, we quickly thrust the stick forward, simultaneously advancing the throttle, and catch the nose right on the horizon, holding it there until cruising speed is resumed, co-ordinating our throttle to keep our engine turning normally and not under strain. Remember to steer clear of using any aileron while waiting for the burble point. Keep your wings level and nose straight by careful use of the rudder. Since the rudders are the last control to blank out in a stall, we come to depend on them in this maneuver. Ailerons are tricky near the stalling point and we'll get in trouble using them, resulting in sloppy flying at our high altitude and you know what at low altitudes.

No. 2 Power-On Stall. The preliminary here is the clearing turn and clearing our immediate area with our head, neck and eyes. When cleared, we lift the nose gently and smoothly to a position just above landing attitude, holding that position as above with throttle at or slightly under cruising until the nose begins to settle in the stall. At this point we recover exactly as we did in No. 1. However, we discover that the extra split seconds into the stall and past the burble point means we can't catch the nose on the horizon. It begins to rise a little below the horizon. We co-ordinate our throttle as in No. 1.

No. 3 Power-On Stall. This is a complete, unadulterated stall. We begin by clearing our area. Then we lift our nose a little higher than in the two previous stalls and gradually bring our elevators back, careful to keep our wings level and nose straight. In this stall the airplane will have a tendency to turn off to the left which is overcome and compensated for by holding a little right rudder — not too much — just enough to maintain a straight heading. Without permitting the nose to go higher, we gradually come back with the stick until we feel the "break." It's a feeling you would be likely to get if your stick suddenly bent. At this instant we haul back completely on our elevators — as far as they will go. Our nose will immediately fall toward the horizon. As it "cuts" the horizon, we release our pressure, allowing the ship to fall forward (assuming throughout this series we are in a light trainer). The plane



starts diving until it regains flying speed, and then we ease back on the stick, smoothly bringing our nose back up to the horizon, co-ordinating all the while our very important throttle. Remember — we don't touch the throttle in this No. 3 Power-On Stall until recovery from the dive. There's considerable argument and difference of opinion on this point so my advice would be to contact an inspector or instructor in your locality and find out their preference.

It is mandatory that your elevators be held hard back and *kept* there until the nose cuts the horizon on its downward swing. If properly executed the nose will drop clean and straight with only the slightest pressure on right rudder to keep your heading. It's a good idea to do these stalls over a straight road or section line in order to check the rise and fall of the nose, because it's essential that the nose does not waver.

Power-Off Stalls

Even though they're a bit more difficult, we flew the power-on stalls first because altitude is gained in their execution — altitude that's needed for the power-off stalls, which are next on the sequence list. We must clear the air for possible visiting aircraft exactly as we did above — plus another little duty, namely, the application of carburetor heat, which is always applied in power-off maneuvers.

No. 1 Power-Off Stall. Heading into the wind after clearing our area (are you getting tired listening to that

one?) with throttle off and carburetor heat on, we slowly lift the nose to landing position, holding it there as we did in the No. 1 Power-On stall, until the nose drops. We recover in exactly the same manner by briskly thrusting the stick forward, increasing throttle, catching the nose *on the horizon*, being sure to co-ordinate throttle as we regain flying speed. Release carburetor heat as soon as possible.

No. 2 Power-Off Stall. Clear your area, ease off your throttle, pull on the heat and ease your stick back smoothly until the nose is *slightly higher* than in landing attitude. Gradually ease the stick back without permitting the nose to go any higher. When the nose begins to drop, make recovery as in No. 1 stall above, remembering to co-ordinate throttle and release carburetor heat.

No. 3 Power-Off Stall. After clearing, easing throttle off and gently lifting the nose above landing attitude and even higher than the preceding stall, we get the "break" more suddenly than on previous stalls. We then bring the stick all the way back. As the nose falls, we continue to hold the stick full back until the nose again cuts the horizon, when we release stick pressure and allow the dive to continue until we have regained flying speed. When flying speed is attained, we ease backward on the stick and as the nose rises, carefully co-ordinate throttle until we are at cruising in level flight. When going into this stall, something develops peculiar to the more radical type of power-off stall — a tendency of the ship to turn to the right. We must anticipate this tendency and apply a little left rudder, remembering to be mighty careful to hold our wings absolutely level. After the complete "break" we are careful also to use the rudder without "walking" it.

Many students are "stall shy". Perhaps the best way to cure this ailment is to master the full oscillation stall, which is a splendid confidence-building maneuver. Clear your area, as always and ease slowly back on the stick until your nose is considerably above landing attitude. When the "break" comes, hold your stick hard back and let the nose drop completely. Keep the stick all the way back until nose oscillates back up to the horizon. This maneuver besides being good stall practice also develops the delicate of rudder control.

It even pays dividends later on when flying cross-country because you learn naturally to offset the effects of unusually violent thermals (rough air) by proper use of rudder and avoiding "stick jiggling." This type of rudder control makes long flights less tiring and more enjoyable.

The Spin

At the completion of our stalls we once more resume our ninety-degree climbing turn and start climbing to 3,500 feet. We must work our way back toward the airport, as we are about through with our sequence and at the completion of our spins we want to be in a position to spiral right down into traffic entry position.

As we reach the proper altitude, we clear our area with the standard clearing turn, and if we are as close to the airport as proper traffic entry permits, we stall our ship gently, raising our nose to just above the landing attitude and keep our throttle at about two-thirds cruising. We have learned the smoothest way to go into a spin is with power, because we have none of the shuddering, careening movements created by blasting our plane into a spin. This method is called spinning by delayed stall.

When the plane is just on the point of stall, we give hard right rudder and leave our throttle on until we have completed the first quarter of the turn, at which point we ease the throttle off.

For our convenience we have placed the plane into the wind and over a prominent road. As we ease the throttle back we watch for the first appearance of the road over the nose and call out one-half turn just as we are lined up with the road. We continue to hold our stick hard back with hard right rudder as our plane continues to rotate and as we reach the road again we call one and repeat at the next appearance of the road a turn and a half. By this time our turn rate has increased and the lapse of time from turn-and-a-half to quarter-turn is rather limited but at the one-and-three-quarter turn mark we call that figure and simultaneously give a sharp thrust on left rudder until the rotation of the plane stops, at which time we rapidly neutralize our rudder and release the pressure on our stick allowing the pressures on the elevators to pull the stick forward. (Allow me to remind you, this is *small ship* recovery *only*, because in heavier planes the rudder must be held hard opposite and a sharp forward thrust must be given the stick.) As the stick comes forward, the nose will go into a diving position just as in the recovery from any stall. When sufficient flying speed has been recovered, we ease the throttle all the way on and take advantage of the speed generated from the dive to regain as much altitude as possible.

It must be remembered, however, that the only strain we place on our aircraft is in recovery from the dive; so we must wait until we are certain the plane is entering the climb before we apply throttle.

In seeking our Private Certificate, the CAA Inspector is mainly interested in our ability to keep orientated and competence in our spin entry and recovery. He expects us to be sufficiently proficient to recover not more than thirty degrees from our original point of entry.

Be sure to have carburetor heat on throughout this maneuver, as forced landings are common due to engine failure from icing when spinning without carburetor heat.

It is also well for the student to remember that the ability to accomplish a spin is an art and that he must fly his ship every instant while it is spinning or with just the least relaxation on the stick it will recover rapidly from the spin and subject him to a great deal of embarrassment.

Every plane has different spinning characteristics. Likewise, every pilot spins just a little differently, so before taking a test in an unfamiliar plane, be sure to practice a few spins in it before the Inspector rides with you.

The Spiral

At the completion of spins, we are ready to go into our spirals. By this time we should be as close as possible to our position of traffic entry. The Inspector will, in all probability, call for a 720-degree spiral to the right and a 360-degree spiral to the left.

The idea of the spiral is to lose altitude while holding position over one particular spot on the ground with proper allowance for drift. The spiral teaches us the proper use of back stick in the power-off as well as power-on turn, in relation to rate of bank.

We must keep our speed constant at all times and the bank must be as steep as we are able to make it and still control our plane. It will take considerable practice but will reward us in the end. The maneuver is invaluable for all types of flying, because a good pilot must constantly be ready for a forced landing, and learning how to hold position over an area while losing sufficient altitude to make a successful landing in the best available field is one of the most important prerequisites to safe pilotage.

The 180-Degree Side Approach

If we are over the point of traffic entry at the completion of our spiral, we of course lose sufficient altitude by ninety-degree gliding turns to enter traffic. If we are farther out, we go back toward the airport, using some

(Continued on page 64)

BOMBS AND BOMBERS
Powered by Humble

Toluene, basis for the destructive power of American bombs; and high-octane aviation gasoline, flying power for American bombers, are two of the war products that Humble is producing in great quantities.

From Humble's Toluene plant is coming more of this vital material than was available from all other sources before the war. And one Humble refinery has produced more high-octane aviation gasoline than any other plant in the world.

This is a part of the war job to which 13,000 Humble employees are devoting their all-out effort.

Esso

Today Humble-Esso Aviation Products serve the vital demands of war; tomorrow they will serve equally well the needs of peace.

HUMBLE OIL & REFINING COMPANY

GUERILLA AIRLINE

(Continued from page 33)

in China now, but everywhere you looked on that side of the world—Indo China, Thailand, Burma, the East Indies, the Philippines, the entire South Pacific area. China's last lifeline would most certainly have been severed had not CNAC stubbornly refused to fold up in the face of a total war that to most of the Western World had remained merely the China incident until Pearl Harbor. Without a lifeline, it is doubtful if China could have continued the struggle. Without China in there fighting, the picture would have been even blacker for the United States and Great Britain.

Background for Air Victory

Ever since the Sino-Japanese war of 1894, the Japs had been extending their influence over China. In the early days of the Nationalist Government, China's tough-minded Generalissimo Chiang Kai-Shek was aware of the aid a well-developed air transport system would afford in uniting the provinces into a strong nation. Greater China encompasses nearly 4,300,000 square miles of territory, is a third again as large as the United States. China proper's 1,000,000 square miles is divided by the great river basins, the Yangste and the Yellow, and most of her population of 450,000,000 then was rooted to the great alluvial plains and teeming coastal cities. With only a scant 6,000 miles of railroad, 56,000 miles of roadway, transportation for the most part was by shanks' mare, bullock cart or river boat.

Prior to 1929, there had been several short-lived attempts to establish a national airline. Then in that year, CNAC was born of the union of the National Government and a United States Company known as China Airways, Federal, Inc., U. S. A. The government owned the majority interest, leaving technical direction in the hands of U. S. experts who had contracted to train Chinese pilots as part of the program.

CNAC's first planes were small Loening amphibians which established service from Shanghai up the Yangste to Hankow. By 1931, the line had spread out to Nanking, Anking, Kiukiang, Shasi, Ichang, Wansien and Chungking.

The concern was losing money hand over fist, however, and on March 18, 1933, with the ready co-operation of the National Government, Pan American Airways acquired the holdings of China Airways. From then on expansion was rapid. Harold M. Bixby, now a vice president of Pan American, took over in China with Bond, who had joined CNAC two years earlier.

Among many CNAC heroes are these four Americans. Above left is V. P. Bond, who outwitted Japs time and again, with Charlie Sharp, operations manager, who flew Madame Chiang to safety once and later piloted famous Burma Banshee. Below left is Dick Rossi, former AVG pilot, with (right) Moon Chin, Baltimore-reared Chinese pilot who pioneered China's new aerial life line.

—PAA Photos.

First CNAC transports went winging from Shanghai to Peiping by way of Haichow, Tsingtao and Tientsin. Soon Nanking was included in its regular service. Turning southward, CNAC serviced the coastal cities of Wenchow, Foochow, Amoy, Swatow, Canton and Hong Kong. At the Crown Colony, CNAC made connections with British Imperial Airways, which flew in from Penang on the Malay Straits, and with the Pan American Clippers which had spanned the Pacific to Hong Kong by 1937.

By 1937, CNAC reached as far west as mountain-ringed Chentu and was serving cities on 3,500 miles of air routes. Multi-engined equipment had been introduced; up-to-the-minute bases, radio and weather stations had been constructed. Traffic, meanwhile had burgeoned from a mere 354 passengers in 1929 to a yearly total in excess of 15,000. Mail loads and flight mileage were up 2,100 per cent.

Then in July of 1937, the Japanese moved on China in force, cutting off one by one CNAC's regular terminals. Peiping went first, then Tsingtao, then Shanghai. By the end of the year, all CNAC's coastal services were suspended and the Yangste route went only as far as Kuikiang.

CNAC moved its office to Chungking in 1938 and began to establish new routes as the old ones were cut off, among them a line southward from Hankow to Changsha. With the coastal ports in the hands of the Japanese, CNAC became truly China's lifeline. Expanding its international operations, it began in 1939 to fly from Chungking to Hanoi in French Indo-China, from Chungking to the Crown Colony at Hong Kong and from Kunming to Lashio and Rangoon in Burma.

Methodically the Japs began to lop off these outside terminals. The Hanoi run was abandoned in 1940 when, with the permission of the Vichy French, the Japs moved into Indo-China. Hong Kong fell late in 1941 and then the Japs opened their big drive on Burma.

Heroes in DC-3's

In Burma itself, meanwhile, as U. S. Gen. Joseph Stillwell's forces fought the Japs of Nippon in sweltering jungles along the Irrawaddy River, six transport planes with CNAC pilots at the controls flew nightly from India to hidden landing fields behind the battle lines. Each plane carried from six to eight thousand pounds of combat and medical supplies for the embattled Chinese, British and American troops. Each plane brought back to India and safety more than sixty refugees packed into a transport designed to carry only twenty-one passengers. The last few flights were completed with the Japs actually within range of the evacuation fields, their patrols cluttering up the skies over the India-Burma frontier.

All told, this transport miracle is credited with the rescue of more than 8,000 persons. One CNAC pilot, Capt. Paul W. Kessler of Chicago, made four trips to Myitkyina, the only remaining city in Burma that was not yet in Jap hands, in the last day the operations could be carried out. Capt. Kessler snatched 250 people out from under the noses of the invaders establishing a record on the last trip by cramming seventy-eight persons in his twenty-one-passenger plane. For this operation and for his work in dropping food for evacuees in the Hukwang Valley, he was decorated by the Chinese Government and awarded the Kaisar-I-Hind Silver Medal for public service in India.

The Generalissimo and Bond, Pilots Moon Chin and Kessler, typify the

(Continued on page 54)

Another MARTIN USA Martin First

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Engines start instantly in sub-zero weather

. . . *thanks to this new* Martin lubrication system

WHEN radio warns of approaching enemies instant starting is required . . . and instant starting in sub-zero weather is now possible on U. S. planes, through Martin's newly-developed cold-weather lubrication system. Vital to victory today, this new device holds great promise as a means of starting automobiles, trucks or tractors on bitter-cold mornings. Here's how it works.

Without the Martin Method

Oil for an airplane engine is kept in a tank, not in the crankcase. A compartment within the tank lets some of the oil warm up faster than the rest so that it gets to the proper running temperature quicker. An oil cooler between the engine and tank keeps the oil from getting too hot. Pilots, landing in cold weather, press a button which introduces gasoline into the oil so that when they start the motors later the cold oil will be thin and permit a quick take-off. However this gasoline often evaporates from the hot engine, the oil is not thinned properly and when the engine is started, the oil cooler is blown up by the thick oil being forced into it. Result—disaster.

With the Martin Method

To meet this problem, Martin engineers devised the new lubricating system which:

1. Injects the diluent into the oil after it has passed through the engine. This prevents the hot engine from evaporating the diluent leaving the system filled with thinned oil.
2. The new system utilizes a by-pass to prevent cold, hard oil from blowing up the oil cooler.
3. The Martin system permits dilution with dual return lines to the oil tank, one line leading to the warmup compartment, the other to the main section of the tank.
4. With the Martin system, the diluted oil is returned to the warm-up compartment, thus avoiding dilution of all the oil in the tank.

Result—mission accomplished!

Proved in action, on Martin and other planes, the new Martin lubrication system has solved a major problem of global warfare—has brought added safety and efficiency to U. S. aircraft—and has opened new vistas for peacetime industry. In war or in peace, keep your eye on the Martin star.

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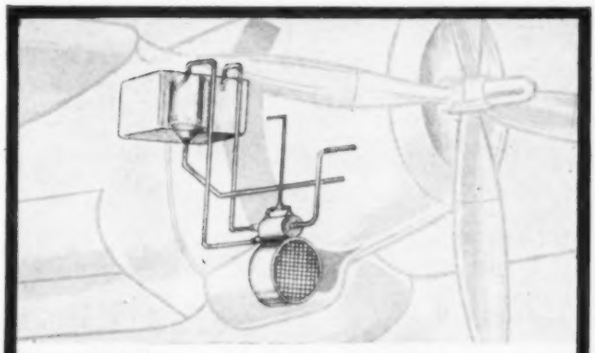
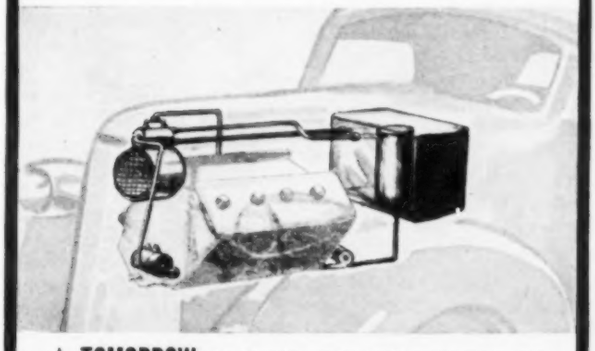


★ **TODAY,** the new Martin lubrication system is saving precious material and even more precious lives, in addition to giving our planes still another advantage over enemy types.



★ **TOMORROW,** the Martin method will mean much, not only to commercial airlines, but also to manufacturers and owners of trucks, tractors, buses and private automobiles.

Martin AIRCRAFT

Builders of Dependable Aircraft Since 1909

GUERILLA AIRLINE

(Continued from page 52)

determination of the Chinese Government and its American partner, the native Chinese and American personnel, to keep China's civil air transport in operation at all costs. Bond set the tone back in 1932 during the Shanghai incident when he refused to permit the war to interrupt regular scheduled service on the Shanghai-Nanking run. The Japs protested to the American Consul. The board of directors of CNAC demurred. Bond took the bit in his teeth, rode the route as the only passenger and finally got the board's permission to continue the service.

The tradition he established then by refusing to let military activity halt civil air operations was carred on by every member of CNAC's staff when the war began in earnest in 1937. To carry on called for new peaks of courage daily, unparalleled ingenuity in operations maintenance and repair. Bond continued to regard CNAC as a staid, business organization. His pilots would shrug off hairbreadth escapes with the remark: "merely a routine operations." Some of these "routine operations" afford an idea of what the staid, businesslike organization was up against fully geared for war.

In 1937, CNAC had four Douglas transports and eight other aircraft. It was bombed out of Peiping in short order after war broke. The Japs struck Shanghai in August, wiping out all the airline's land installations and destroying two Douglas Dolphins on the water. CNAC moved on, a step ahead of the invaders, to keep the Generalissimo's headquarters, wherever it might be established, in touch with the outside world.

Since CNAC was partly an American enterprise, formal protests were lodged with the Japanese. The smiling Japs were so sorry. The bombing went on, and on August 24, 1938, with the war barely a year old, five pursuit ships shot the first CNAC plane out of the air. Capt. Hugh L. Woods of Kansas brought the transport down on a river. The Japs lesiurely strafed the wreck until all but one of its fourteen passengers and two of its crew members were killed. Capt. Woods escaped by diving under the bullets which lashed the water all around him as he swam ashore. The plane was salvaged from the river, repaired and returned to service.

That attack was the tip-off, and from then on CNAC operated only at night and in foul weather. The night flying technique proved invaluable two months later, when CNAC was called upon to evacuate essential government personnel from Hankow. In three nights, landing by the light of flickering oil lamps, CNAC flew 296 government officials to safety from the besieged city. Among the last to leave was Mme. Chiang Kai-Shek. Just as CNAC's operations manager, Capt. Charles W. Sharp, was about to take off with her, a Chinese waving a red lantern came running up to the plane. He merely wanted to remind the Captain, he said, that except for the narrow runway the field had been mined with fifty-pound bombs these last three days.

Capt. Moon Chin made the last flight out of Hankow in a flying boat with CNAC personnel as the Japs were entering the flaming city. Once the red glow from the fires on both banks of the Yangste were behind him, Moon found the night as black as Tojo's heart. So at Shasi, 120 miles up river, the co-pilot merely leaned far out of the cockpit and flashed a hand torch on the water so Moon would have light enough to land.

CNAC pilots perfected their own technique for carrying out their schedules right over the Japanese-occupied territory and front-line positions, and for landing and taking off in the midst of air raids. Only one pilot got caught. In October, 1940, Capt. W. C. (Foxy) Kent decided to sit out a raid then raging over a certain city, at a government emergency landing field in the vicinity, after observing two government planes on the ground and decided there were no raiders nearby. Fifteen minutes before Kent showed up, however, the Japs had caught the two government planes on the ground and riddled them. Four of five Zeros had climbed back to high altitude, but the pilot of the fifth spotted the transport. They all came down in a bunch on Kent's tail, let him have it just as his transport rolled to a stop. When the Zeros climbed up again they left Kent dead, one passenger shot to death on the ground, six passengers burned to death in the transport which their tracers had fired. Two other passengers and the stewardess were wounded. The latter died of her wounds.

Jap Murder Victim

W. C. (Foxy) Kent was murdered by Jap Zeros in October, 1940. Five caught him as he landed on an airport. Six passengers burned to death in the plane and a seventh was shot dead as he sought to run from it. Two others were wounded and the stewardess died of wounds received. Kent had landed after waiting out an air raid, but the Zeros spotted him as he came in and dived back for the attack.

FOXY KENT

Saga of Burma Banshee

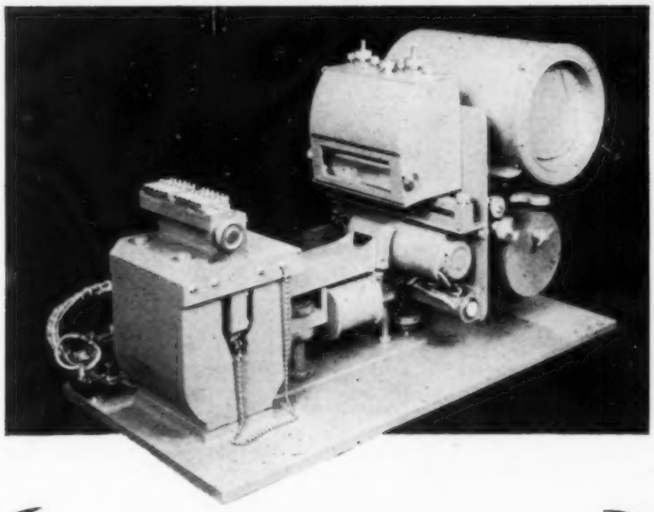
In May, 1941, the Japs trapped a DC-3 on the ground at Suifu, dropped a bomb that blasted one wing completely. The only spare available was a DC-2 wing at Hong Kong. With that, CNAC pilots flew it to Suifu, it was patched onto the DC-3 and the aircraft was flown back to Hong Kong for permanent repairs. The flight of that DC-2½ has now become legend.

After the debacle at Hong Kong, CNAC's magicians perfected another patchwork job that kept the Zeros out of the skies for three days over northern Burma. The plane that figured in it, known as Whistling Willie, the Banshee of Burma, was the DC-3 that Bond had been so concerned about when he was writing up his diary at Chungking. In the evacuation of Hong Kong one of its engines conked out at Namyung, and the enemy patrols worked over the plane most carefully, leaving it in ruins, the engines shot up, the instruments destroyed, the propellers holed, the fuselage virtually a sieve.

Rather than take a chance on the enemy returning to complete the job of destruction, CNAC officials decided to patch the plane up as much as possible and fly it to a safer place, since Namyung was only about fifty miles from the Japanese lines. Engines were flown in from Chungking, and the wreck was pieced together in the dark. Fabric patches were stuck on over the 3,000 holes in the fuselage. Capt. Sharp climbed aboard at daylight, and miraculously the plane flew. He made Kunming without incident, but there he ran into a thunder storm. The driving rain washed off first one patch, then another, and soon the wind was screaming through the 3,000 holes. The din was terrific, like 3,000 bagpipes all shrilling in a different key.

Rather than wait for the invading Japanese at Lashio in Burma, Capt. Sharp took on a load of passengers and cargo and set out for Calcutta. Six Zeros swooped down on him out of a clear sky; then turned tail and fled. Capt. Sharp reached Calcutta safely, and for three days there was much speculation about the unprecedented scramming of the Zeros and the ab-

(Continued on page 64)



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EQUIPMENT IN WORLD-WIDE USE

Necessary Contract Termination Procedure Listed by Callery

A uniform procedure should be established by Congress for the termination of contracts at the end of the war, Vice President Francis A. Callery of Consolidated Vultee Aircraft Corporation and financial spokesman for the major aircraft manufacturers, told the Oklahoma City Clinic.

"Unless provision is made for an orderly and rapid settlement of war business it is easily possible the entire capital of the aircraft industry, including the alleged war-time profits, will be wiped out," Callery warned. "The output of the aircraft industry is twenty times that of 1939; its capital resources have not kept pace with the growth of its business. The cost of shrinking such a business is as much a cost of the war as the cost of expanding it. I suggest that a uniform termination procedure should be set up by legislation, which would embody among others the following principles:

"1. Accounting practices should be established, so that contractors will know in advance what expenses will be allowed, and what expenses will not be allowed, with perhaps a central bureau to rule on doubtful cases.

"2. Contracts may be cancelled only upon advance notice of, say, thirty days. I do not for a minute contend that the government should go on buying any war equipment, when such equipment is no longer needed. In my opinion, this would be economic waste of the worst type, but I do think a thirty-day turn around period is a reasonable request.

"3. The government, within fifteen days of demand, should make advance payments to the contractor of ninety per cent of the termination claim, certified to in accordance with the accounting regulations.

"4. Prime contractors should be given the right to settle in full the claims of subcontractors in amounts not to exceed $25,000.

"5. Subcontractors' claims in excess of $25,000 may be endorsed over to the government by the prime contractor, with subcontractors to have all rights enjoyed by the prime contractor.

"6. Payment should be made for liabilities incurred in good faith in the war effort which are not specifically applicable to any one contract. These would include certain inventory items, prepaid local taxes, insurance, leases, service contracts, and other commitments of similar nature which may extend for a period of time beyond the date of contract cancellation.

"7. Payment should be made for certain overhead expenses incurred from the date of contract cancellation to the date of contract settlement.

"8. Contractors should be reimbursed for all severance compensation required to be paid to employees whose services are no longer necessary.

"9. The unamortized portion of property acquired under certificates of necessity should be allowed as an expense in contract termination.

"10. Renegotiation should be suspended on all terminated contracts, on the principle that the termination settlements in themselves can prevent the earning of excessive profits."

CLINIC SETS PACE

(Continued from page 37)

part of the market. Some determined personal aircraft interests should proceed immediately to form a front of their own outside the older organizations which are committed too broadly to represent us properly. One of the propositions besides the Lea Bill is whether the CAA is to continue in its present form after the war. None of us advocates changing horses in the middle of the stream, and therefore we are quite willing to wait until peace comes to get action, but we certainly ought to have decided before that time just what kind of a structure we need."

Personal Aircrafters Stress Utility

Views and policies of the newly formed Personal Aircraft Committee of the Aeronautical Chamber of Commerce of America were presented by Joseph T. Geuting, Jr., vice president of General Aircraft Corporation of Long Island City, N. Y. The PAC was also represented at the clinic by two of its organizers, Don Flower of Cessna Aircraft Company and Carl Wooten of Beech Aircraft Corporation, and its manager, John E. P. Morgan, of Washington, D. C. Over fifty manufacturers of personal aircraft and their engines and accessories are members of the Personal Aircraft Committee. Avoiding statistical data and visionary prophecy, Geuting emphasized that personal aircraft in peace time will have to possess utility. "Utility," he said, "means much more than just the aircraft. It means many and convenient landing facilities, simple, easily understood and unhampering regulations, and practical weather and navigational aids." He urged planning now for provisions after the war of adequate airports and landing strips, located closely adjacent to cities and small communities, and adequate developments in radio and meteorological services to serve the personal aircraft owner and operator.

W. T. Piper, president of Piper Aircraft Corporation, and Flower of Cessna, joined in a view that personal aircraft will require many small airports located in and near cities. "The family plane has no business on the big fields," said Piper. "What we need is a lot of little fields close in." Flower went farther: "There are too many airports being built ten miles and farther from town, when what we need is small landing strips in downtown parks so the pilot can land within a few blocks of where he wants to go. Too many communities are planning elaborate airports which will serve the big transport planes but will not be of much use to the personal aircraft."

More Small Fields Planned

Provision of adequate facilities for private flying is the primary postwar airport problem, said William A. M. Burden, special aviation assistant to the Secretary of Commerce, who added that incomplete CAA plans indicate the need for an additional 1,900 small, eighteen hundred-foot to twenty-five hundred-foot effective length fields for the private flyer. Postwar airport requirements cannot be foreseen in detail, he said, but they fall into four general categories: (1) development of large airports in a comparatively few areas for transcontinental and transoceanic operations; (2) development of existing designated air carrier airports; (3) development of facilities for local or feeder scheduled service, and (4) development of facilities for the private flyer. We now have some 2,800 civil airports, of which 750 are suitable for transports. In addition, we have several hundred military airports, of which less than half will be permanently useful for civil purposes, Burden said. Our airport system must be "greatly expanded — it will have to provide about 6,000 airports, most of them for private flying."

Burden made a strong plea for continuation of the Civilian Pilot Training Program after the war. He expects a large proportion of it to be conducted in high schools, with colleges remaining the backbone of the program although many of them will be able to carry on without federal assistance.

Fixed-Base Outlook

Encouragement for the fixed-base operator was delivered by Roscoe Turner, the noted speed flyer, who now operates his own aeronautical corporation at Indianapolis, Ind. After the war, he said, aviation will influence the lives of millions. The job is too big for the airlines alone to contact everybody. It will be done more and

(Continued on page 58)

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CLINIC SETS PACE

(Continued from page 56)

more by fixed-base operators. As an example of how the fixed-base operator can carry aviation to the public and do it efficiently and profitably, Col. Turner cited his own record. Fixed-base operators will have great opportunities in sight-seeing hops, student instruction, aircraft sales and rentals, service and overhaul, charter operations, sale of fuel and lubricants, and storage. In a discussion following Turner's address, numerous ways to increase airport profits and business were pointed out by Dudley Steele, manager of the Lockheed Air Terminal at Burbank, Calif. These included hotel service, auto service and storage, shrewd handling of all concessions, volume purchase of utilities such as electricity, gas and water and their resale through separate meters to operators on the field, and other novel enterprises already tried and proved worthy at Burbank.

Carriers To Be Protected

Discussing the "Domestic Air Pattern for Tomorrow," Harllee Branch of Washington, member of the Civil Aeronautics Board, emphasized the CAB's determination to keep the air transport industry in a sound condition. This policy, he said, will be followed in deciding on the flood of recent applications for authority to operate air services. Referring also to efforts of the railroads and other surface carriers to enter air transport, as well as to compete in international operations, Branch commented: "No one who has the sound development of the air transportation industry at heart wishes to see its future endangered by overexpansion. The Board has determined that the provisions of the Civil Aeronautics Act rigidly restrict the participation of the older forms of transportation in the air transport field and this determination is amply supported by well established congressional policy." Summing up, Branch said the air transport industry "seems to be in a most favorable position for getting quickly back into normal operations after the end of the war and for an accelerated and prosperous growth. Certainly there is no other industry in this country which has a more assured future."

Cargo Expectancy

Air cargo expectancy cannot be reduced to facts and figures at this stage, said C. P. Graddick of Chicago, director of the air cargo department of United Air Lines, who cautioned against building bright hopes on false impressions. For one thing, said Graddick, there is not a single airplane in commercial airline operation today designed as a cargo carrier. There are many unknown factors yet to enter into cargo expectancy. However, Graddick pointed to many improvements in aircraft and operations pointing to lowered costs after the war. He expects all long-haul first-class mail to be carried by air soon after the war, and he forecast inauguration of air parcel-post. All long-haul rail express carried at rates higher than LCL rail is potential air express if reasonable air rates are offered. Continued growth of air shipment for perishables, high-poundage value merchandise, style goods and other classes of air express is expected, particularly in plane-load quantities. Looking at the over-all picture, Graddick said much harm has been done by air enthusiasts promising absurdly low rates for air cargo in the immediate future.

Delay Seen in New Planes

Speaking on the primary transport for local and feeder air service after the war, C. Edward Leasure of Washington, chief of the proceedings division of the CAB, warned that new type airplanes for local services, including combination and pick-up equipment, will not be ready "until at least one year after Germany's collapse" and that commercial helicopters are at least another year off. Thus there is time for careful planning. Aircraft engineers have called attention, he said, to problems to be met in operating into and out of small fields, making frequent stops and using reduced block-to-block speeds. Douglas engineers, for example, have furnished the CAB with detailed studies covering three prospective airplanes—a six-, a twelve- and a twenty-four-passenger plane. On a seat-mile basis, the twenty-four-passenger plane was claimed to be the most economical. Costs for the six-passenger one were shown as about twice that of the present DC-3. As to helicopters, Leasure referred to Igor Sikorsky's promise that if the war should end today, it would still take two and one-half years to deliver a ten- to fourteen-passenger helicopter. He appealed for full and thorough consideration of all factors.

Surplus Disposal a Menace

Disposal of military aircraft after the war was seen as posing many problems, and after a talk by Wayne Parrish, editor of *American Aviation*, the clinic adopted a resolution urging disposal to be handled by an appropriate government agency in such a manner "to protect taxpayers from unnecessary loss, the consumer from unreasonable prices, labor from unemployment and manufacturers and other interested businesses from destructive competition at home or abroad." Parrish warned that chaos will follow indiscriminate dumping of surplus aircraft, particularly the 12,000 or more surplus transport airplanes which he estimated will be available for disposal. He urged that no surplus airplane be sold without being thoroughly reconditioned or converted by the manufacturer, and also recommended that steps be taken to avoid handicapping air carriers when surplus transports are leased or sold to foreign countries. Parrish also urged that the government give to each of the 28,000-odd high schools and colleges in the nation a military airplane and an engine and perhaps obsolete instruments for use in ground instruction and educational work. S. W. Voorhees of Lockheed urged that surplus aircraft be assigned to their original manufacturers for modification, conversion and salvage.

Air Education Expanding

Aviation education is a public necessity and should be expanded, the clinic was told by Dr. Bruce Uthus, director of the CAA's aviation education service. In an address which inspired those attending, he told how the CAA in February, 1942, undertook to encourage and foster the introduction of aviation education into public school courses. Because Federal authorities could not impose aviation education on many local school systems, a series of meetings throughout the country were held to "sell" the idea to the local systems, and in a four-month period over 100,000 school officials were reached in this manner. Many obstacles included lack of teaching aids and materials, ways and means of integrating aviation into regular school courses and lack of aviation-minded teachers. But by September of 1942, the voluntary program had been developed to the point where materials had been prepared, 4,000 teachers had been trained in CAA ground schools and 14,000 high schools offered preflight aeronautics courses to over 250,000 students between the ages of sixteen and eighteen. The teacher problem is still unsolved, and Uthus urged that teacher-training institutions recognize the fact that training teachers in aviation subjects is as vital as training them in mathematics, science or other subjects. Meanwhile the CAA is providing teachers with a small staff of consultants. Arrangements have

(Continued on page 64)

Many think of the air simply as a thrilling new dimension for man to explore. Actually, it is far more. For here is a great new freedom for man—freedom to move at will, straight as an arrow, from any point on the Earth's surface to any other, unhindered by mountain, city or sea—freedom to range far and wide, as a bird, through the clear and illimitable reaches of the sky.

The all-out effort of all citizens must be concentrated on War until the Axis slave-masters are crushed, if we are to enjoy any freedom. Today Jacobs employees are devoting their utmost to this vital objective—producing engines by the thousands for the United Nations.

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AVIATION'S EXPLOSION

(Continued from page 41)

sive of bolts, nuts and rivets, with some sixty parts called out some ten times, but only one part called out as many as 300 times. I would say that we surely have a mass of parts but not necessarily mass production. At least, if you consider that we only need ten baggage door handles per day for the planes and one thousand per day for the motor car or refrigerator.

So, I hope you will agree with me that we are manufacturing in a very orderly manner, but not necessarily mass-producing. This latter is a misnomer, a figment of imagination of the columnist or the guy who thought we'd be stamping them out by the good old American Can method. But you may point out, that we are producing by stamping and assembly-line methods—but not in mass quantities.

In this set of questions about production comes the $64.00 one—it runs like this: "Aren't we going to be able to really produce them cheap after the war?" That's a real Eversharp question—and one that I do not choose to answer specifically. My guess is that we will not produce them cheap. The aircraft engineer will have the same buying power for his productive labor as all other industries, but it seems that our public and our customer are thinking of their 1938 dollar when they plan to buy after the war. We have learned a lot of tricks from our own hard work and mistakes, and have lifted others from the automobile and accessory folk, but we yet have to smack out half of the wing ready for paint in one cycle of a clearing press. This business of airplanes just doesn't work that way — or at least, we have not been fortunate enough to have had the experience during all of this exploding and war-production effort.

Then, the critics ask, but how about the motor boys? Won't they know how? To this, I say, the longer the war goes on, the clearer it becomes that no one can draw a red line down the middle of the page outlining the aircraft production program and call one side the airplane group and the other the automobile group.

The two of them are tackling this manufacturing problem together, with the same approaches, the same selection of workers, and, mind you, the same tooling.

There is another interesting phase of this business of airplanes and the position in which we find ourselves today. It has to do with changes and much has been said about their ill effects on the production line. But possibly not enough has been said about the value they afford the boys flying them. Resisting a change is not a characteristic peculiar to the engineer or the production man. It's simply human nature asserting itself when the change is not a voluntary one.

We have averaged at some plants about one military change a day since we started delivering combat airplanes. But, in all fairness, the numerical comparison here is as lacking in good engineering logic as the former comparison of numbers of airframes built per year. One trainer plus one bomber equals two—but what a contrast any way you look at it. The same applies to changes. Moving a bracket over so that the bomb selector lever can be relocated and installing a chin turret constitutes two changes; but there is a wide difference in work involved and the functions they perform. The first took about ten days to get into the works; and the other took four months to hit the line. I insist that if armor plate should be added for better protection, or another location of the voltage regulator is necessary to keep the ship flying—then it is up to the gang at home to co-operate in doing it —but quickly.

Here is where our complex manufacturing system comes into view again. You can't go out into a shop today and draw on the floor with a piece of chalk to tell Joe what to do and how to do it, and pass it off by saying that the drawing will be changed (if there is one) the next time it comes up for correction. No, Joe or Josephine does not work that way today, so it takes about 250 pieces of paper to get the bracket moved. The expert mechanic or shop man who used to build them for us and with us is now the supervisor, and the stockroom man who got us bolts that were "one inch and three little marks long," is now the production-control manager. It's the old problem — easy to build but hard to manufacture. You must have the paper mill if you expect a dilution of the old "know-how" to the degree of thirty thousand in a million. One cannot just hang the chin turret on any old way and pull materials out of stock and get castings in quantity overnight, and Joe can't get the tools changed until there is a work order and the paper mill has started grinding.

Changes Mean Progress

I think that this problem of changes is a swell challenge to the designer, the draftsman, the tool and production engineers, and every mother's son of us. We can lick it just as we have solved the changeover from building to manufacturing. It will naturally take time, but missing serializing a change that might save a man's life just for want of too much paper work certainly does not sound logical. We must change. Constant progress in the military effectiveness of our products must be accelerated and encouraged — not resisted.

You might think that I am arguing against the modification centers. They have their place to take care of the theatre modification. Why winterize a P-38 for Africa, when what it really needs is a good air-cleaner that would extend the engine life from ten hours to about 250 hours.

My point is that the engineering and manufacturing philosophy of changes must be right and, if so, the physical accomplishment will come easier. The special changes will continue to be added at Dallas and points east, west, north and south. The modification groups have done a swell job and the subcontractors that have aided and supported them have performed equally as well.

To a group of engineers there is always this business of weights. During all of this speeding up of production we have been speeding up the requirements on our structures. Again, a representative figure covering the past five years indicates that a gross weight increase of a representative four-engined bomber has reached 57 per cent. That's a good job of stretching. If we could only find more places to tuck in another gas tank or two, it might help. This comes home to us as we read of the Salerno operations, where some land-based fighters were operating at the limit of their range; they had but fifteen minutes' activity over the battlefield area after arriving on the scene. To evaluate in engineering terms what 100-pounds increase through the addition of gasoline is worth, is a most complex problem and one that the industry cannot solve alone, but needs the co-operation of the operating units and the engineering sections of the services.

That's this business of airplanes. They are undoubtedly the most compromised piece of equipment that moves. It is an engineering battle from the three-view on out—it's weight, performance, production, maintenance, military load, and always cost and delivery schedule. It's these facts that are so frequently overlooked, not only by those of us in the business, but those out.

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CONFUSION *on the Potomac*

A House Committee hearing reveals the pathetic inadequacy of overlapping agencies dealing with aviation matters. Read the following testimony with this thought in mind: "Would such confusion be possible if we had an independent Department of Air staffed with technicians and experts?"

A RECENT meeting of a Special Committee of the House of Representatives Committee on Military Affairs elicited some interesting testimony that might be illuminating to airmen, especially those who contemplate some day putting into production new models or types for markets other than the U. S. military services. Such a person is R. S. (One-Hop) Johnson, of Fort Worth, Texas, whose activities toward getting priorities to build fifty light, cleanly designed "Rockets" wound up in the Special Military Affairs Committee meeting referred to above.

Among the witnesses called, besides Johnson, were T. P. Wright, director of aircraft resources control office, Aircraft Production Board; Major Joseph W. Phillips, Army Air Forces, special duty staff, Emergency Rescue Equipment Section; and W. L. (Jack) Nelson, technical assistant to the executive director of War Training Services, CAA, and formerly acting chief, aircraft priorities branch, War Production Board.

Johnson tried to interest both the Army and the Navy in his unique low-wing, two-place "Rocket" but nothing came of it. Later, the Mexican Government and certain civilian agencies bound up in war work evinced interest in the design. It was at that point Johnson went before the WPB for allocation of materials to fill these orders, and was refused on the basis that the materials requested were critical and that the Army specifically was not interested in new types of trainers.

The testimony of Major Phillips is particularly enlightening:

The Chairman: You were authorized to make this trip down to Fort Worth?

Major Phillips: Yes, sir, I was ordered to make this trip to Fort Worth, I think it was about five weeks ago, to test-fly the plane and look it over, see if it was acceptable and a soundly designed plane, and also to look over the drawings and other designs and manufacturing facilities of the Johnson Aircraft Co.

Mr. Burton: Please state what you found upon that investigation.

Mr. Phillips: First, I went out to look the plane over and I had the Johnson Aircraft test flyer fly the plane, and I observed the flying from the tower of the airfield there, and this test flyer flew this plane in all of the different maneuvers and conditions you could fly an airplane; flew it upside down, spun it, and looped it, slow-rolled it and snap-rolled it, and, well, went through whatever maneuvers you could possibly try to go through with any airplane, and I observed that.

Then, after he came down I went up in the airplane myself with the test pilot and I flew the airplane, took off and landed with it; put it in a tight bank, more than seventy degrees to the right and left. I tried it out for stability, after trimming the plane up, on a direct course and I flew the plane about thirty miles on a direct course after I had trimmed it up without touching the controls. After that I took it back over the place where we had been doing the maneuvers and I spun the plane and it came out of the spin all right. It did not seem to have any adverse spinning characteristics that I could find. I flew this plane about one hour and thirty-five minutes altogether. I consider it a very stable plane and in my opinion it is one of the cleanest designed airplanes that I have ever seen.

For economy in operation every designer of an airplane always tries to cut down the drag because that is what you have to pay for in horsepower in order to push an airplane through the air, especially at high speeds. This airplane cruised at level flight at 150 miles an hour, and at a very low angle of glide with throttle wide open, attained 180 miles an hour.

I could not find anything on the landing gear that was detrimental to the airplane. The landing gear was lowered and raised many times during the flight and takeoffs and seemed to work all right. I consider the landing gear as a very good design of retractable landing gear.

As you gentlemen know, the Army Air Forces have had more accidents in connection with landing gears than in any other one thing. That was a very important thing I was looking for, to see if there was any defect in the landing gear.

After I flew the airplane, I went to the plant of the Johnson Aircraft Company; they showed me the design of the larger airplane, both the single-motor and the bi-motor jobs. I looked over the plans very carefully, and they had incorporated in the design of this airplane a similar type of design of the one they had built and had tested. In other words, the whole design of this low-wing monoplane was similar to the one that they had built, and I considered this design as a very good design.

Mr. May: Mr. Chairman, may I ask a few questions?

The Chairman: You may.

"Difficult to Get Anything Done"

Mr. May: Major, I understand you made two recommendations, or two paragraphs — the last two of your report — made recommendations that a trial order be given and that this plant be utilized so that the facilities may be in aid of a test of this particular plane and of the war effort. Do you know why that recommendation — what consideration, if any, that recommendation has had by the authorities of the War Production Board?

Major Phillips: We are in the office now— we are set up under the Joint Chief of Staff. Our main mission is to co-ordinate research developments of emergency rescue equipment. So far as we are interested in that plane, it is in connection with the rescue of personnel, either on water or on land, and that was our primary object in getting interested in the plane, to find out if it could be used in rescuing personnel, and this recommendation for a trial order—we have made recommendations that we think it is a good plane for rescue work and it should be bought on that recommendation, that the procuring agencies of the government, such as the Bureau of Aeronautics and the Bureau of Materiel of the Air Forces consider this plane for rescue work.

Does that answer your question?

Mr. May: That partly answers it. Does this have to go through the War Production Board for the granting of priorities? Do they have to handle the question of priorities for the metals that go into it?

Major Phillips: Yes, sir.

Mr. May: Do you know whether or not they have passed on it?

Major Phillips: No, sir, they have not.

Mr. May: Do you know why?

Major Phillips: No, sir, I don't know why.

Mr. May: Have you made the request, or your Board made the request that they do pass on it?

Major Phillips: We made a recommendation. See, all we are set up, under the Joint Chief of Staff, is to make a recommendation.

Mr. May: Yes.

Major Phillips: We have made a favorable recommendation—

Mr. May: Yes, how long ago was that done?

Major Phillips: Well, it was at a meeting of the Emergency Rescue Equipment. The date of that meeting was probably a week ago, when we discussed it and they agreed that we would recommend this plane for emergency rescue work, and on that—of course, you know on that committee there are a lot of dif-

ferent agencies of government, representing the Bureau of Aeronautics, the Bureau of Standards, the NRSA, the Army Air Forces, the Ground Forces, and so forth, of the government, have members on that committee.

Mr. May: And the WPB—and altogther it is a difficult job to get anything done down there, isn't it?

Major Phillips: Well, it sure is. I have been on duty, since I was called to duty two years ago now, and it is a hard job to get things through. It is not like being out in civilian life as an engineer, when you know what you are going to do—when your company tells you to do something, you can get it done.

Mr. May: Let me ask you one more question; do you have any other manufacturers down there where they are using their own money, without asking the government for any money, or any contracts, that you know of?

Major Phillips: In Fort Worth?

Mr. May: Anywhere.

Major Phillips: There is only one other office I know of that has done that and that is the Mills Novelty Company. They have a small amphibian. I have tested that and made a favorable report. I think it is a very light amphibian, just a little heavier than a Cub. That is the other, the only other outfit in the country, just those two outfits that I know of, down there.

Mr. May: Well, as a taxpayer and not as a congressman I would be very much delighted to see somebody use their own money instead of asking the government.

Major Phillips: I would too, because I have to pay taxes, and I know a lot of money has been spent, because I was over in General Killay's office the first four months, when I came on duty, in experimental engineering, and they were spending plenty of money over there in connection with financing people to do research work on planes.

Mr. Elston: Along the same line, Mr. Johnson testified here a few minutes ago some of these training planes cost thirty to forty thousand dollars and this plane could be built for perhaps $9,000. Now what have some of these specific planes referred to got that this plane has not got?

Major Phillips: Well, the Cessna—speaking of the Cessna, I have flown a Cessna and I have also been in a Cessna as a passenger. The Cessna has two 250-horsepower engines and the safety regulating body of the Army Air Forces has ordered, or restricted, that the Cessna not be flown any more than about 140 to 150 miles an hour. They said it could not be flown in rough weather and should never be flown on instruments. We have had quite a lot of accidents with the Cessna. That is a matter of record, the wings coming off, the fabric coming off, and other accidents. I dislike to fly in a Cessna, but that is about the only plane we have right now for use for liaison purposes. It was primarily designed for an advanced trainer. They don't use it very much for that now. They use it more for liaison work.

How "Cost Plus" Boosts Prices

Mr. Elston: I take it then that the Johnson plane has even better performance than the more expensive plane?

Major Phillips: Well, the Cessna now has been—you cannot carry more than four passengers, they don't like it—if you put any baggage in there, they don't carry more than three passengers.

Now the Johnson design can do the same thing and you only have got a 125-horsepower as aganist two 250-horsepower, and you can get greater speed out of the Johnson aircraft; I am pretty sure it will cruise from what I saw and everything, and from the way that plane is designed, it will at least cruise at 180 miles an hour and be safe.

Mr. Elston: What, in your judgment, accounts for the disparity in price?

Major Phillips: I am not too familiar with cost. I just go on the engineering side, but in my opinion it is the whole setup of cost-plus —well, as an engineer I have let contracts with firms on a cost-plus basis, and it always generally cost the company more than the regular contract. When I was with DuPont, I was a project engineer,—that was back in 1929 when things were booming, and when prices were high and it was hard to get contracts unless you let them on a cost-plus basis. There were always a lot of things that were rung in when they really didn't need them on the job. We could check them as close as we could and yet they would run in persons on the job that they really didn't need, and lots of times persons would be standing around on the job and the company would have to pay for it on a cost-plus basis, so that the government had to do the same thing; and anything let on the cost-plus basis costs you more, on the average.

Mr. Elston: I think we will agree with that. It is a fact that this plane could be used as a trainer plane?

Major Phillips: Yes, sir, it could be used as a trainer plane. In fact, the Navy considered it when they gave it consideration and they tested it for quite a number of days—how many days was it?

Mr. Johnson: Two months.

Major Phillips: They gave it a very thorough test; they were considering it for a trainer plane. We considered this simply as being a primary trainer single-engine type that we could use for a trainer plane, and the two-engine type for an advanced trainer plane similar to what the Cessna was designed for.

Mr. Elston: You mentioned you flew the plane thirty miles without touching the controls. Is there anything significant about that?

Major Phillips: Well, there are not very many planes you can do that and still fly on your course.

Mr. Elston: Well, is it equipped with a gyroscope?

Major Phillips: No, sir, just trimmed it up and it was stable.

Mr. Elston: I see.

Major Phillips: I mean, that is the real test, you can put a plane through all sorts of maneuvers, you can loop it, snap-roll it, slow-roll it and do all those other tricks with it, but the main idea of an airplane is to go from one point to another in straight flight, and that is what they have to do most of the time when you are flying an airplane, and if a pilot has to sit up there and fight the airplane all the time to stay on the course, you can see he is going to be very tired, but that is what you have to do with a lot of planes, especially in rough air.

Now if you can design a plane, get a plane so that you can trim it up and it will stay up there and hold on its course, you don't have to bother with it for a long time, then it is easy and the pilot can sit back there and relax. Do you see what I mean?

Testimony of Theodore P. Wright

Mr. Burton: Are you familiar with the Johnson Aircraft Corporation?

Mr. Wright: My connection with it came solely in connection with the case in question. Mr. Walling was referred to me by Mr. Wilson's office on May 11th, in connection with the method of obtaining a priority for building an order of fifty airplanes, part of which will go to the Mexican Government, it was stated.

I referred Mr. Walling to Lieutenant Christy, who was the acting recorder, Joint Aircraft Committee, to see whether it was appropriate at this point to go into scheduling and have space allocated for its construction. That same day, or possibly a day later, we had an official letter from the Johnson Aircraft to Lieutenant Christy making application for material priorities for construction of fifty airplanes for this purpose, giving a very brief description of the plane, and a day or two later — that letter was amended, changing the request for twenty-five, part of which were for Mexico and part for civil uses. It came up before the Joint Aircraft Committee within about a week, and it was disapproved by that body on the basis that the capacity for building light trainers was not necessary and that the present manufacture was being curtailed because the program had reached such a point that the military services did not need so many of that class of plane, so presumably the recorder of the Joint Aircraft Committee notified the Johnson Aircraft of this rejection and the reason. I have not seen that correspondence.

Mr. Burton: I have before me a letter dated May 28, 1943, signed by S. F. Christy, and it reads—it is on the stationery of the Joint Aircraft Committee, Washington, D. C.:

"Johnson Aircraft, Inc.,

"Fort Worth, Texas.

"Attention: Mr. R. S. Johnson, President.

"Gentlemen:

"Reference is made to your letter of May 11th, 1943, requesting clearance for the manufacture of fifty model 30 airplanes, and two letters dated may 13th, 1943, from Mr. J. B. Walling, your Washington representative, reducing your request to cover twenty-five planes.

"At a meeting held on May 20, 1943, the Joint Aircraft Committee considered your request together with all information pertaining thereto. It was the decision of the Committee that your request be disapproved, and said decision is transmitted to you by means of this communication."

And it is signed S. F. Christy, Lieutenant, USNR, Acting Recorder, Joint Aircraft Committee.

I asked that that be entered into the record as an exhibit.

(The document referred to was marked Exhibit 2.)

Mr. Burton: I would like you to identify that letter, if you can, and the signature.

Mr. Wright: Yes, sir, that is undoubtedly the official notification.

Mr. Burton: Did you give any further explanation to the Johnson Aircraft Company?

Mr. Wright: Presumably nothing more official than that. I can only quote you the consideration of the sub-committee of the Joint Aircraft Committee which first considered the case and presented the case to the main committee, in which the following is stated:

"It is the opinion of the sub-committee that said request should be disapproved, since it would seem unwise to authorize the production of newly designed light airplanes, the company not being in the approved program, in view of the fact that the production of the light type plane manufacture is being curtailed because of the limited requirements for these types."

That is the reason why the sub-committee disapproved it, which data was presented to the Joint Aircraft Committee, upon which the sub-committee came to that conclusion.

The Chairman: Did your committee go into the question as to whether Mexico was willing to take the plane, and some of these other manufacturers are not?

Mr. Wright: No, sir, not to my knowledge; there was no official request of any kind from Mexico, nor mention of it that the plane was

to go to a foreign government. If the plane was to go to a foreign government, the government would have to make the request to our government for the approval of the purchase, and no such request was received from Washington so far as I am aware.

The Chairman: Did you have any plans to use the Johnson Company otherwise than this?

Mr. Wright: No, sir, just a desperate need; we are in desperate need for as much subcontracting as we can get for types on their program.

The Chairman: But your Board is not willing to put out for the development of any new types of planes of this character at all at the present time?

Mr. Wright: That is correct.

The Chairman: It adheres to existing planes, turning them out, one type, one model, without any change or modification?

Mr. Wright: That is correct, sir. It has been particularly emphasized in the last six months by General Arnold that he wants to cut down types to the maximum possible extent, from the standpoint of maintenance and service, as well as of increased efficiency and gain in production, that you do build more, by having a fewer number of types.

(The second installment of this article will be published next month.)

GUERILLA AIRLINE

(Continued from page 54)

sence of enemy patrols over northern Burma.

The answer came over the Tokyo radio in the best University of Southern California English: "Enemy forces are moving into northern Burma in force," the Tokyo announcer declaimed. "Spearhead of their invasion is a new aerial weapon designed foolishly to unnerve the Emperor's conquering pilots, who hold mastery of Burma's skies. This secret weapon spouts streams of flame and screeches in horrible tones as it flies. A Chinese Dragon, perhaps? A product of the English-Chinese? Foolish, indeed! This white man's folly, too, will be driven from the Asiatic heavens."

CNAC's wartime activities have by no means been confined to evacuating refugees, transporting strategic personnel, vital war materials, and maintaining the lifeline beyond China's borders. Inside the country it was the one means of carrying funds to the governors and generals throughout the territory and food and military supplies to Chinese troops battling the invaders in remote virtually inaccessible regions.

Nor are fighter planes and bombing raids the only problems CNAC has had to contend with during the war years. There are those little matters of fuel supply, repair parts, inflation and "corners" on gasoline. On one occasion in 1942, when CNAC had to get thousands of cases of pig bristles out to the Allies and part of the journey had to be made by trucks, a "corner" on fuel jacked up the price of gasoline to $15 a gallon.

Here's one indication how prices have skyrocketed during the war. When the seat of Chiang's government was at Hankow in 1938, the invaders saved their very best bombs for the military airfield and CNAC's commercial airport just outside the city. A Chinese contractor offered to fill in the craters on the military field for $2.50 Mex each, $3 per hole on CNAC's airport. His explanation of the differential was that since the military field was larger and thus a better target, he could offer the military "wholesale rates."

In Chungking, meanwhile, where the Yangste used to wash out CNAC's airport every rainy season, a Chinese contractor undertook to pave the field with tombstones, "which the river couldn't burgle," for $11 Mex per fong (100 square feet). After one year of war, the price rose to $17 per fong. After three and one-half years, it was $240 per fong. Not so long ago, when the runway had to be lengthened a bit to check out new pilots for cargo-hauling runs, the price was $1,260 per fong.

CNAC is mighty proud of its personnel, from pilots to maintenance and repair men. Many of its American and Chinese pilots are veterans of ten years' standing. To them recently had been added a number of Maj. Gen. Claire L. Chennault's famed Flying Tigers, who joined CNAC when the American Volunteer Group was disbanded.

Perhaps the best known Chinese pilot is Moon Chin, a native of Kwangtung Province but a U. S. citizen, educated in Baltimore. Moon Chin has often flown Generalissimo and Mme. Chiang Kai-Shek, as well as most other high officials of the Chinese Government.

Dick Rossi, AVG veteran who joined CNAC in August, 1942, and has flown regular schedules into Calcutta and back, considers the old days a vacation compared with CNAC's flying. "But if it's that much harder it may be that much more important," Rossi says, "and we're interested in getting this war over with any way we can . . ."

THE SEQUENCE

(Continued from page 50)

type of co-ordination exercise until we reach the traffic entry point.

Heading downwind forty-five degrees to the runway on which we are to land, we approach as near the runway as previous training for good approach has taught us. We then execute a forty-five-degree turn to the right, which places us parallel to the runway. We hold our position until we come to the spot on which we intend to land, at which point we cut the throttle and establish our glide. It is important to maintain the same glide throughout our approach pattern as our ability to hold constant speed is an important factor with our Inspector.

When completing your landing, remember to hold your stick hard back until the plane stops rolling, and then on your way back to the hangar apron do not forget to "S" turn as you did on your way to take-off.

Be sure and study your local taxi traffic pattern and turn off the runway in the direction prescribed for your own airport.

Throughout this series on the sequence we have endeavored only to give you special little pointers and tips not usually found in books on flying and which are left to the Instructor to give you. We appreciate the present scarcity of Instructors and have attempted to supplement the various splendid training manuals published for student flyers, especially the one published by the CAA. You will find in the CAA manual the exact way which all the foregoing maneuvers are to be accomplished with the scientific results obtained by the right and wrong use of the controls.

Happy landings and many of them. The author would be pleased to answer any personal problems which have not been covered in these articles. A letter addressed to him in care of this magazine will reach him promptly.

CLINIC SETS PACE

(Continued from page 58)

been made with the Army and Navy, Dr. Uthus announced, whereby planes, plane parts, engines, engine parts, flight instruments and the like that are rated as nonoperative are released to the schools for instructional purposes. Dr. Uthus, incidentally, was presented by the Oklahoma City University the first honorary degree of "doctor of laws in civil aeronautics education" ever conferred.

Dr. A. C. Willard, president of the University of Illinois, told the clinic that fourteen colleges and universities now have accredited courses in aeronautical engineering, and another twenty-five give options to permit junior and senior students to specialize in the aviation field.

Postwar Plan for AIRPLANE SERVICE

A LOT of people are talking about postwar aviation, but Leslie H. Bowman of Fort Worth, Texas, one of the country's leading fixed-base operators, is doing something about it — inaugurating *now* improvements and changes in sales, maintenance and service necessary not only to keep abreast of significant trends but to be ahead of the inevitable postwar conversion in aviation.

"As progress is being made in the design and performance of airplanes, important steps are also being taken to improve the maintenance and servicing of these airplanes," said Bowman. "These changes are occurring more frequently than most people realize, and those that will come tomorrow will come just as rapidly and will be just as significant in the advancement of flying. That is why we must be more alert and responsive to improvements."

Bowman, who is president of Aircraft Sales Company at Fort Worth's Meacham Field, claims nothing new in his reasoning. It has been the policy, in fact, which has guided the success of the half-million-dollar institution he heads since its founding in 1939. His principles have been proved again and again in the automotive service field. Following that policy has distinguished Aircraft Sales as the Southwest's leading distributor of airplanes, parts and accessories as well as an outstanding organization serving other operators and private flyers in maintenance and repair service.

With over 10,000 hours of flying, and numerous trophies won in national and international aerobatic competitions, to his credit, Bowman has built his organization around personnel — he has 197 employes — which have been flying, designing, selling and repairing airplanes for many years. Much "know how" from experience has gone into the planning of the Company's three major divisions, two

Les Bowman

of which are located off the airport, where Bowman's large and modern hangars, general offices, and store, along with radio and instrument departments, are located.

One principle of Bowman's is to pattern all charges after the customary factory flat rate — the most satisfactory and business-like way of doing business. Aircraft operators flying into his base can obtain service of every nature just as if the factory were located there, and in a minimum of time and expense. This applies to aircraft and engine, parts, accessories, instruments and radios. The company is factory sales and service representative for leading products, and its four large stockrooms supply not only its own modern shops and retail store but a large number of operators and dealers throughout the states of Texas, Oklahoma, Louisiana and Arkansas.

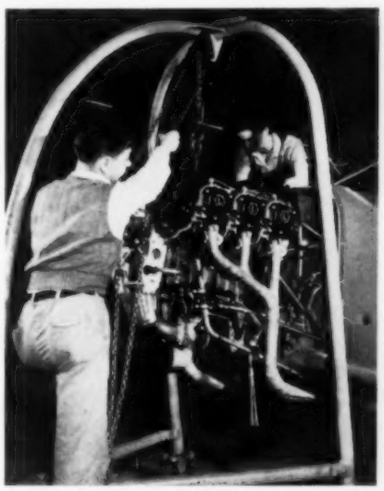
In overhauling engines, as much care goes into the disassembly as in the work itself, for good repair demands thorough cleaning and inspection, with proper equipment, of all parts. Bowman's shops are equipped with the same close-precision machines, tools, instruments and fixtures that are used in the factory. Air-conditioning and humidity control are important adjuncts to his shops.

Bowman stresses that complete facilities mean more than duplication of factory service. "The idea," he said, "is to make it possible for aircraft operators to fly in for the work they need just as they would drive their auto into a modern, completely equipped and efficient dealer's place."

That's bringing airplane sales, maintenance and service right up to date with airplane design and performance improvements which are attracting more and more people to flying. As to what kind of airplane they will fly after the war, Bowman does not want to go into details. He is Southwest distributor for Stinson. But, he emphasized, his institution will handle the sales and service of the airplanes that bring a new meaning to flying.

"We're going to have better airplanes and better engines," Bowman commented. "And they're going to require better service and repair work if their usefulness is fully employed. I intend to see that this kind of service—the best there is—continues to be available to the great Southwest."

★ ★ ★



A new meaning to flying is given by Lycoming's new six-cylinder horizontally-opposed Model 0-435 air-cooled engine of 185 horsepower, shown here being installed in a Stinson. Fort Worth's Aircraft Sales Company is already completely equipped for sales, service and overhaul of these new motors, for which it is factory representative.

You'll fly better planes with better engines after the war. It follows that you'll need better service and maintenance. Les Bowman wants the Southwest to know both will be available at his growing Fort Worth Institution.

Beech Drills Own Gas Well for Heat

For some plants the fuel shortage will be a big problem this winter. But Beech Aircraft Corporation at Wichita, Kansas, has put one over on the rationers. They drilled a well on the Beech airport and it turned out a dry hole. But then they moved the location a few miles and struck fuel—plenty of it, and all Beech's. All of which goes to prove Kansas a mighty resourceful place for industry, particularly the energetic kind like Beech.

2200-H.P. CYCLONE 18 was announced last month by the Wright Aeronautical Corporation as being in quantity production for super bombers, fighters and transports. Two banks of nine cylinders have total displacement of 3,350 cubic inches. Diameter is only fifty-five inches.

Thousand Heavy Bombers Among 8,789 Planes Built in November; Navy gets 12 New Carriers, 2,000 Planes

Aircraft production reached a new high of 8,789 planes in November, including more than 1,000 four-engined bombers, an increase of 427 planes over October production, Donald M. Nelson, War Production Board Chairman, announced. November production was at a rate of one plane every five minutes continuously day and night, or 338 airplanes produced each working day, and Nelson emphasized that this production was largely combat planes. November output in weight of planes surpassed October by 7 per cent, while airframe weight increased 9 per cent in October over September. Secretary of Navy Frank Knox simultaneously announced that about a dozen aircraft carriers were produced in November and that over 2,000 airplanes were accepted by the Navy, adding, "in fact, we received almost 2,000 fighters and bombers."

Since July, 1940, when 2,300,000 pounds of weight of airplanes were produced, a month to month increase in weight of output has averaged 9.4 per cent, with November output in weight reaching 81,500,000 pounds, or a thirty-five-fold increase in three and one-half years, Nelson stated.

Wilson Stays on Job After Resignation Hinted

Charles E. Wilson, who was reported to have resigned as executive vice chairman of the War Production Board to return to his position as president of General Electric Co., was prevailed upon by War Mobilization Director James F. Byrnes to remain with the WPB until released by President Roosevelt. It was said that heavy pressure from the industry was the cause of refusing Wilson's resignation. Wilson is considered a first-class production man whose relations with aircraft and other munitions producers have been uniformly good, and is credited in WPB circles for breaking many bottlenecks in aircraft production. Wilson, however, was said to be still eager to return to his company, and would leave on the nearest date to which the President would agree.

Meanwhile, Bernard M. Baruch, recently appointed director of postwar adjustment unit of the Office of War Mobilization, denied that he had picked Donald M. Nelson, Chairman of WPB, to direct the conversion of American industry to peacetime production. It was reported that Nelson is willing to remain for the postwar period, while Wilson is anxious to return to private industry.

CV Cited for Production Records on B-24's and Boats

Consolidated Vultee Aircraft Corporation led the aircraft industry in efficiency in three production classifications since June 1 in the War Production Board's efficiency indices, and the San Diego division produced more four-engined bombers in October than have ever been produced by an aircraft company in one month, Harry Woodhead, president of Consolidated, announced. San Diego led the heavy bomber classification, with Liberator output in terms of airplane-pounds per employe per day thirty per cent greater during July, August, September and October than that of any other heavy bomber manufacturer. Nashville division led in the single-engine bomber field for efficiency in production, and the Vultee Field division was first in basic or advanced trainer and utility transport plane classification. Woodhead stated that the man-hours necessary to build a Liberator have been reduced thirty per cent since January, following a cut of approximately sixty per cent in 1942, and that production of the B-24's since January increased seventy-five per cent, despite 17.6 per cent loss in production workers. Woodhead added that the October production record of Liberators at San Diego was achieved at the same time Navy schedules for output of Catalina and Coronado flying boats were met.

Douglas Completes First Year at Oklahoma City

Pearson

C. C. "Chet" Pearson, manager of the Douglas Aircraft Company's Oklahoma City plant, has completed the first year of production of C-47 Skytrains, military version of the DC-3. Pearson, a native Californian, joined Douglas in 1930 as a draftsman. Advancing through the engineering division, he became assistant to the chief engineer in 1939. Before taking over the management of the Oklahoma City plant, he was assistant to F. W. Conant, Douglas vice president in charge of manufacturing.

First Douglas C-47 to be produced was flown over Oklahoma City February 27, 1943, only four months after start of fabrication.

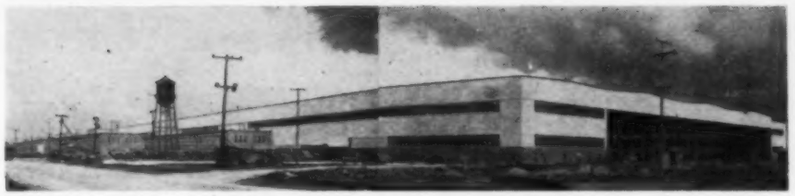
Lockheed Triples P-38 Output with Convair as Major Subcontractor; Nashville Plant to Build Lightning

A vast expansion program to meet a new daily production quota of P-38 Lightning fighters which runs into hundreds of planes per month, five times the Army Air Forces requirement one year ago, has been announced by Lockheed Vega Aircraft Corporation. The new daily quota will treble present production of the twin-tailed Lightning, which has been used as strafer and bomber as well as fighter, and is now in its twelfth version. "Accceleration of production is being achieved by concentrating most of Lockheed's facilities on P-38 final assembly and by subcontracting the construction of component parts on a large scale," Robert E. Gross, Lockheed President, said.

Lockheed will retain fabrication of fuselage, forward booms and tail surfaces, while Consolidated Vultee Aircraft Corporation, the major subcontractor, will fabricate and assemble leading and trailing wing edges, aft booms and power plant installations at its Nashville plant, and build wing center sections at its Downey, Calif., plant. Eventually, Consolidated will assemble complete Lightnings at Nashville, but during the expansion program the subassemblies will be shipped to Lockheed at Burbank. Two of Lockheed's California plants will be devoted to packing, shipping and tooling when the subcontractors get into their component programs.

The list of other subcontractors includes Hudson Motor Car Company, Detroit; and Rheem Manufacturing Company, Weber Showcase and Fixture, Avion Incorporated and Timm Aircraft Corporation, all of Los Angeles. Lockheed will continue its current output of the P-38, which requires only one-half the man-hours to build as formerly needed, and will furnish master tooling, complete data and a backlog of components to subcontractors, who are still being selected.

The P-38 program office in Burbank, under the direction of Mac Short, Vega vice president in charge of engineering, is conferring with the engineering and production staffs of Convair headed by Charles Marvin, and Lockheed technicians are at work at the Convair Nashville division.



Here's a panoramic view of the new forty-six-acre factory of Higgins Aircraft, Inc., at New Orleans, opened last month. Curtiss C-46 transports will be built there. At right are Andrew J. Higgins, founder; his son, Frank, president of the aircraft firm, and Col. John H. Jouett, executive vice president.

NAA Juggles Supervisory Personnel at Dallas Plant

Numerous new personnel assignments at North American's Texas Division were effected recently to bring the Texas division nearer its full supervisory strength. A number of aircraft men were obtained from the California division through the streamlining of the Inglewood organization and many supervisory personnel, already employed at the Dallas factory, were re-assigned to new positions more suited to their abilities and experience, Factory Manager H. F. Schwedes explained.

Smith Heads Magnesium Sales in Mid America

Arthur Smith, Jr., has been named head of magnesium sales for the Dow Chemical Company's Southwest territory with headquarters in St. Louis, Mo. In addition to St. Louis, his territory will include Wichita, Kansas City, Tulsa, Dallas, Oklahoma City and Fort Worth.

Jeffers Represents Rhodes

G. S. Jeffers has been appointed Southwestern representative for James H. Rhodes & Company, manufacturers of felt products, steel wool, pumice, abrasives, sponges and chamois. Jeffers, who formerly was associated with Keystone Tool and Supply Company and has serviced the aircraft industry for many years, will make his headquarters at Arlington, Texas.

Alabama Tire Plants Enlarged

Award of contracts recently for the construction of a 256,000-square foot addition to the Gadsden, Alabama, plant of Goodyear Tire & Rubber Company completed plans for Goodyear's thirty-million-dollar tire expansion program, P. W. Litchfield, chairman of the board of Goodyear, has announced. Litchfield emphasized that the tire-expansion program has been largely devoted to new tire and processing equipment for synthetic rubber to be installed in already-existing plants, with only three plant additions being made. The Jackson, Mich., and Decatur, Alabama, plants were enlarged in addition to the Gadsden, Alabama, plant. Other Goodyear American plants are located in Akron, Los Angeles, and Cumberland, Md.

Turco Opens Texas Factory

Turco Products, Inc., manufacturers of industrial chemical compounds, has opened a new factory at Houston, Texas, which will serve the Southwest, Vachel Poole, district manager and supervisor of Turco operations in Texas, Oklahoma, Louisiana, Arkansas and Mississippi, announced. Turco chemical compounds are used for aircraft engine overhaul, airplane and marine maintenance and for cleaning and processing of metals in heavy industries.

McDonnell Adds Experimental Buildings at Lambert Field

McDonnell Aircraft Corporation recently leased two hangar buildings, comprising some 27,000 square feet, at the Lambert-St. Louis Airport to be used as a manufacturing area for experimental work. The hangar buildings and office building between, owned by American Airlines and leased by St. Louis School of Aeronautics, will be known as Building 14. Previously, McDonnell leased a building of approximately 34,000 square feet.

An addition to their staff and promotion of three members within the organization has also been announced by M. A. C. E. E. ELLIOTT, formerly chief test pilot at Curtiss-Wright Corporation's Buffalo plant, was appointed chief test pilot. Elliott, who has 3,572 flying hours, graduated from Pensacola in 1929 and served twelve years as a Navy pilot. While at the Curtiss plant, Elliott flew performance demonstrations for the Army and Navy and also test-flew P-40 fighters and C-46 cargo planes. The men promoted are: ROBERT H. CHARLES, formerly supervisor of the legal department in the fiscal division, now staff assistant to the president; P. M. COZARD, to assistant comptroller, and ROY JORDAN, formerly personnel activities supervisor, to staff assistant for public relations.

Lockheed Absorbs Vega

Vega Aircraft Corporation was absorbed into Lockheed Aircraft Corporation on November 30, Robert E. Gross and Courtlandt S. Gross, presidents of the two companies, announced, adding that Vega had been entirely owned by Lockheed for two years and the merger involved no change in ownership. The merger was effected now in the interests of closer co-operation and increased efficiencies and economies for the war program, as both companies are building the P-38 fighter, B-17 bomber and Navy PV-1 land-based bomber, the Gross brothers stated. No details of reorganization were given, but Courtlandt S. Gross, Vega president, was previously appointed vice president and general manager of Lockheed.

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PERSONALS

Mambert Demarest Webb Macauley

STEPHEN B. MAMBERT, formerly associated with Kingsbury Ordnance Plant, La Porte, Ind., has been appointed assistant to the president of Republic Aviation Corporation. Mambert, who previously was associated with Thomas A. Edison as vice president and director in charge of all operations, was connected with Vacuum Oil Company prior to joining Kingsbury . . . JOHN M. DEMAREST, recently associated with the WPB in charge of aircraft plant expansions, has been named plant manager of Wright Aeronautical Corporation's plants in the Paterson, N. J., area. Demarest, until recently assistant to the general superintendent of Wright Aeronautical, previously was plant engineer of International Business Machines Corporation. . . . JAMES E. WEBB, secretary and treasurer of Sperry Gyroscope Company, Inc., has been elected vice president of the company. Webb will continue as secretary of the company, but is succeeded as treasurer by F. W. KILDUFF, formerly assistant treasurer . . . C. B. F. MACAULEY, aviation journalist, has joined Fairchild Engine and Airplane Corporation as assistant public relations director and will assume editorship of the *Pegasus*, succeeding W. M. KIMBALL, recently resigned to join Cecil & Presbrey Advertising Agency. Macauley was successively editor of the *Civil Aeronautical Journal*, managing editor of *Aviation* and editor of *Air Tech*. He has just completed a book on helicopters to be published in January.

Tom Goldsmith, New Factory Manager at Globe

Goldsmith

Tom R. Goldsmith, formerly production engineering manager at Bell Aircraft Corporation's Buffalo plant, has joined Globe Aircraft Corporation, Fort Worth, as factory manager. Prior to his association with Bell, Goldsmith was connected with General Electric Company at Erie, Pa., for five years and previously was chief engineer for the American Meter Company at Erie. Goldsmith is credited with the invention of the master industrial gas meter, developed especially for large gas users in the Southwest. During World War I he received pilot training at Roosevelt Field, N. Y. He is national program chairman of the American Society of Tool Engineers.

AIRLINES

5,000th War Ocean Crossing Logged

Clippers of Pan American Airways flew more than 160,000,000 passenger miles and almost 17,000,000 plane miles in the three months ending September 30, an increase of over 19,000,000 passenger miles and more than 678,000 plane miles over the previous quarter, the airline announced recently, adding that the 5,000th ocean crossing by the Clippers since Pearl Harbor was completed in November. It was emphasized that these flights were only part of the transport flying being done by the Air Transport Command of the U. S. AAF and Naval Air Transport Service, for which Pan American and domestic airlines operate cargo routes under contract. Total crossings of the Atlantic, including special war mission flights and scheduled commercial runs reached 3,259, while Pacific crossings totaled 1,741.

Tom MacDonald Joins AA

Thomas W. MacDonald, director of public relations at Republic Aviation Corporation, has joined American Airlines, Inc., as director of the Washington news bureau.

ATCA Elects Beard

Charles E. Beard, traffic vice president of Braniff Airways, has been elected president of the Air Traffic Conference of America for 1944. He succeeds V. P. Conroy, vice president of Transcontinental & Western Air, Inc. Other officers are Nelson B. Fry, United Air Lines, first vice president; Thomas Wolfe, Western Air Lines, second vice president; and M. F. Redfern, executive secretary.

Braniff Adds Specialists

Harry S. Murray has been named assistant to the president of Braniff Airways in charge of personnel and training, and Braniff has also appointed Guy M. Springer assistant to the vice president in charge of air mail and air express. Murray, a veteran airman who was a World War I flight instructor in the Army Signal Corps (Aviation), was formerly associated with the War Manpower Commission in charge of special personnel and training work in Chicago war plants. Springer formerly was district manager for the Office of Defense Transportation with headquarters at Pueblo, Colo.

PCA War Work Mounts

Assertedly carrying almost one-fourth of all domestic airline cargo, Pennsylvania-Central Airlines recently stated they have increased efficiency of cargo operations to fly 250,000 miles each month with the same number of planes used to fly 83,000 miles in April, 1942, when PCA's Military Transport Division was put in operation. Directed by Captain J. A. Brooks, veteran PCA pilot, the MTD is operated under the Air Transport Command, with 20 PCA pilots assigned to carry cargo to Army bases west and south of Washington. Three round trips daily to Miami, a daily flight to New Orleans, and service to other Southern cities and bases from Washington are made in four PCA planes and one Army plane. The MTD, which has lost one plane since April, 1942, trains Army and Marine pilots in cargo flying by serving as co-pilots and observers. Special missions performed by the MTD include carrying fifteen crews to Alaska for operations completed in a month over a route from Edmonton, Canada, to Nome, Alaska.

New Applications

Chicago & Southern, which turned away 15,000 passengers in July, August and September because of lack of planes due to military needs, has applied for a total of 41,267 miles of new routes, of which 32,382 miles are in foreign areas. . . Applications by other air carriers last month included: American Export Airlines—a North Atlantic route to Foynes, Paris, Rome, Athens, Cairo to terminate in Bombay, with a split at Athens to Sevastapol, and a South Atlantic route to Capetown, via Puerto Rico, Trinidad, Belem, Natal and Windhook (Africa), with a branch at Natal to Dakar, Casablanca and Algiers, terminating at Rome, for a total of 17,400 miles with Washington, New York, Chicago and Boston as points of origin for both North Atlantic and South Atlantic routes. . . . Delta Air Lines—New Orleans to Havana, an extension of Fort Worth to New Orleans route. . . . Pennsylvania-Central Airlines—New Orleans to Port of Spain, and New Orleans to Havana to Belize, British Honduras, Miami to Barranquilla, Colombia, and Miami to Port of Spain, as well as an extension of Washington-Buffalo route through Rochester to Ottawa, Canada. . . . Braniff Airways—Laredo, Texas, and Nuevo Laredo to Mexico City via Monterrey. . . . Western Air Lines—Los Angeles to Rio de Janeiro, Sao Paulo and Buenos Aires, covering 9,000 miles with twelve other stops in Central and South America.

Parks and Ong Seek Air Routes in Midwest

Two aviation colleges have applied to the Civil Aeronautics Board for postwar air service. Parks Air College, Inc., has proposed a new corporation, Parks Air Transport, to operate from St. Louis, Kansas City, Indianapolis, Chicago and Tulsa. Application for thirty-five routes into Iowa, Nebraska, Kansas, Missouri, Oklahoma and Arkansas has been filed by Oliver L. Parks, president of the company. It is proposed to use Beechcraft for this air service. Kansas Aviation Company, Manhattan, Kansas, has applied for air service between Omaha, Lincoln and Beatrice, Neb., and Topeka, Manhattan, Salina, Hutchinson, Wichita, Kan., covering 408 miles. The Kansas Aviation Company is a partnership of William A. and E. H. Ong of Kansas City, Mo.

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Bendix Boosts Magnesium Casting Output for Aircraft

New Jersey foundries of Bendix Aviation Corporation are producing an average of 400,000 pounds of magnesium castings each month, and increased facilities are intended to boost this total to 8,500,000 pounds annually, Anthony Cristello, foundry manager of the corporation's Eclipse-Pioneer Division, stated recently. A single day's production of magnesium castings in Bendix foundries now exceeds the total yearly output for 1931, the year the corporation began foundry operations. During one month, magnesium castings production equalled the entire 1939 production of all metal castings, Cristello said.

Hockaday Aircraft Sold

Hockaday-Newby Aircraft, Inc., Burbank, Calif., has been sold to Hockaday Aircraft Corporation, Noel R. Hockaday, former president of Hockaday-Newby, and president and general manager of the new company, announced recently. The entire personnel, with the exception of H. L. Newby, became a part of Hockaday Aircraft, Hockaday added.

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ARMY NAVY

WITTEK Aviation HOSE CLAMPS

Personal Aircraft Group Activates 7 Study Units for Future Activities

Study of postwar aviation problems affecting the manufacture and operation of aircraft in business and personal uses has been started by the newly organized Personal Aircraft Committee of the Aeronautical Chamber of Commerce, Joseph T. Gauting, Jr., chairman, announced recently. The committee's statement of principles and objectives outline the basic problems as (1) landing facilities, (2) legislation and, (3) public relations. To solve these problems, seven study projects have been set up for analyzing and planning, namely, (1) examination of regulations and proposed legislation affecting private flying, (2) airport and landing facilities, (3) CAA's training program, Reserve Officers' Training Corps and other pilot training programs, (4) weather reporting in air navigaton, (5) educational aspects of postwar private flying, (6) disposal of surplus war aircraft and (7) air product shows and exhibitions.

The organization is under the direction of John E. P. Morgan, newly appointed manager, formerly Washington representative of Aeronca, Piper and Taylorcraft aircraft companies.

A standing committee of eleven headed by Geuting, vice president of General Aircraft Corporation, represents fifty member companies including manufacturers of airframes, engines, propellers, instruments and other accessories. In addition to Chairman Geuting, the committee includes William A. Mara, Consolidated Vultee Corp.'s Stinson Division, vice chairman; Carl Squier, vice president, Lockheed Aircraft Corp.; T. B. Woodbury, vice president, Culver Aircraft Corp.; C. J. Bruckner, president, Waco Aircraft Co., Inc.; R. H. Depew, Jr., Fairchild Engine & Airplane Corp.; Don Flower, Cessna Aircraft Co.; I. H. Taylor, Douglas Aircraft Co., Inc.; W. T. Piper, president, Piper Aircraft Corp.; Carl Friedlander, president, Aeronca Aircraft Corp., and J. C. Hart, president, Taylorcraft Aviation Corp.

News About Aircraft Parts Manufacturers on Coast

At the November meeting of the Board of directors of Aircraft Parts Manufacturers Association, G. W. Stratton was elected to the executive committee of the Association as successor to R. S. Madison, resigned. Stratton is chairman of the board of Raymond De-Icer Co., Inc., Los Angeles. . . . Seven companies newly admitted to membership in Aircraft Parts Manufacturers Association are located in Los Angeles: Continental Specialties Co., Ltd.; New Plastic Corporation; Precision Manufacturing Co.; Quality Engraving Works, Inc.; Southwest Machine & Plastic Co.; Western Arc Welding, Inc.; Western Screw Products Co. The eighth new member is from Pasadena: Aircraft Bolt & Rivet Company. . . . Thompson Products, Inc., announced changes in its personnel department effective November 15. John R. Bair is now personnel manager. He was advanced from selective service supervisor; and is a member of the selective service co-ordinating committee of Aircraft Parts Manufacturers Association. Bair's assistants are K. O. Howie, who handles employe services and was manager of Bank of America at Bell, California, for a number of years, and Clyde B. Leech, employment manager, who came from B. & L. Machine Tool & Die, Long Beach, where he was personnel manager. Other newcomers in the department are Eileen Kennedy, who will assist with women's counselling and interviewing, and Audre Smith, secretary. . . . Clarke Aero-Hydraulics, Inc., Pasadena, has installed a new cafeteria for employes. It was opened, appropriately, in November, "Food-for-Freedom" month.

Chandler-Evans and Niles-Bement-Pond Merged

Chandler-Evans Corporation, manufacturers and marketers of airplane engine accessories, South Meriden, Conn., has been merged with Niles-Bement-Pond Company of West Hartford, Conn., by exchange of Niles treasury stock for the entire Chandler-Evans stock. Clayton R. Burt, formerly president and general manager of the Niles-Bement-Pond Company and newly elected chairman of the board, announced. Charles W. Deeds, president of Chandler-Evans, retains active management of the corporation and has also assumed the presidency and general management of Niles-Bement-Pond. Deeds was at one time vice president and general manager of the Pratt & Whitney Division of United Aircraft Corporation. B. H. Gilpin, formerly executive vice president of Chandler-Evans, was named vice president and general manager of the subsidiary company. Previously, Gilpin was assistant general manager of the Radio Division of Bendix Aviation Corporation, and prior to that was factory manager of Pratt & Whitney Aircraft Division. The merger made available surplus manufacturing facilities of the Pratt & Whitney Division of Niles-Bement-Pond plant at West Hartford for overflow from Chandler-Evans.

Chinese Studies Aeronca

Captain Yuan Ho of the Chinese Air Force recently visited the Aeronca Aircraft Corporation, Middletown, Ohio, to study the development of the lightplane. He conferred with Val Baltz, plant superintendent; Robert L. Davison, sales division, and others.

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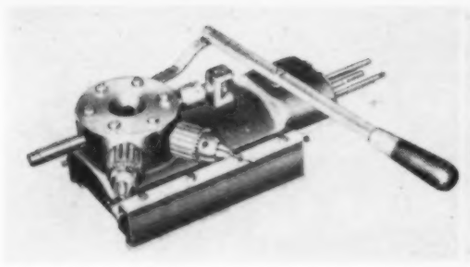

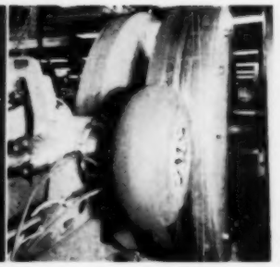

Self-indexing Bed Turret

A new self-indexing bed turret, with six tool stations and six individual stops indexing with the turret, has been developed by Kessler Aero Tool Co., Burbank. Back indexing by hand to speed production when using less than a full set of six tools, is one of the features of the new lathe attachment as outlined by Kessler. Accurate precision repeating is insured because index bushings and lock pins are of hardened and ground tool steel. The turret head is mounted on a pre-loaded Timken bearing adjustable for wear. The attachment is lever-operated and has a maximum stroke of 4" with a minimum index stroke of 1-12" and total travel of 5-12". The turret is shipped finished and assembled except for turret holes which are left to be bored on the individual machine.

New Self-sealing Disconnect Coupling

A disconnecting self-sealing coupling, said to withstand 2500 p. s. i. after ordinary finger tightening, is an engineering development reported by American Screw Products, Los Angeles. Tests show that the heavy construction of the aluminum alloy body prevents distortion and that jamming of the spring-loaded shut-off valve is prevented. Springs are of heat-treated steel. Lightweight cast phenolic poppets are positive sealing in action. The synthetic gasket provides leakproof connection when coupled for service and is available with AAF on AN threads.

91-ft. Farnham Spar Miller

The Farnham Manufacturing Co., has announced the delivery of the world's largest spar miller used in producing wing spars for aircraft. Designed by Paragon Research, Inc., Buffalo, the new machine is similar in principle to other Farnham high speed spar millers which fabricate spars. Overall length of the machine is listed as 91 feet with a table length of 80 feet. Two carriages, with six milling spindles, travel the length of the bed during milling operation. The two carriages operate independently and are used simultaneously when milling long spars, performing as many as six operations at a time, or independently on short spars.

Machine Duplicates Huge Landing Loads

Recently placed in operation by Goodyear Tire and Rubber Company, is a new machine for testing airplane tires and brakes. Goodyear officials say the machine can test landing loads up to 40,000 pounds per wheel, tire or brake, or an equivalent of an 80,000 pound airplane. The machine is powered by a 150-hp motor and can reach top speed in 17½ minutes. The "landing" apparatus plunges a tire against the revolving fly wheel, simulating a plane's landing speed, duplicating the performance of wheels, tires or brakes while landing. Speeds up to 200 miles per hour may be tested, which is considerably more than present-day needs. The entire weight of installation is more than 150,000 pounds, according to Goodyear.

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Al Williams Appointed Consultant to Air Forces

Al Williams, noted speed pilot and former Navy and Marine airman, "father of dive bombing", last month was appointed by the War Department as technical consultant to the assistant chief of Air Staff (Training) of the Army Air Forces, and was scheduled to inaugurate a series of demonstrations for AAF cadets at basic training schools. He will operate out of Fort Worth, as a civilian and without pay, demonstrating in a fighter type plane a routine of aerobatics designed to make cadets more expert in precision flying.

Maj. Williams last May completed a five-week demonstration tour of advanced pilot training schools. In his own plane at his own expense he made eighteen flight demonstrations and delivered some thirty-seven lectures, traveling a total of 11,000 miles. He has often told his friends that he considers the demonstrations to young Army pilots as his most important contribution to aviation.

Super Glider Revealed

The first Waco YCG-13 super glider, which has greater seating capacity than previous Army Air Force's models, was scheduled to make its first flight from the Municipal Airport, Minneapolis, Minn., to the Glider Base at Wilmington, Ohio, recently. The high wing monoplane glider is Waco's third big glider in production, the others being the Waco CG-3A (nine-place training glider), and the CG-4A, (fifteen-place cargo glider). The new super glider was built by Northwestern Aeronautical, under license to Waco. Its passenger capacity was not disclosed.

Embry-Riddle Opens School at Sao Paulo, Brazil

Embry-Riddle School of Aviation recently signed contracts with the Brazilian government to establish and operate the "Technical School of Aviation of the Brazilian Air Ministry". The new school, which is intended as a permanent institution, is headed by James E. Blakeley, Embry-Riddle technical director, and will train some 500 students as technicians specialists in a six-month course for assignments to posts in the Air Ministry. Temporarily located in the immigration buildings at Sao Paulo, unit airport building plans are completed, the school was approved by the U. S. and Brazilian governments, the air forces of both countries and the U. S. Army and Navy. Embry-Riddle sent 100 instructors and personnel in the first group who had been specially trained for the project, and all of whom spoke Portuguese.

NATA Scores Success

A last-minute check-up indicated the fourth annual convention of the National Aviation Training Association in St. Louis on December 2-4 would be one of the most successful ever held. Over 500 leaders in aviation were expected to attend.

Convair Building Navy's New Torpedo Plane

A new torpedo plane, the Sea Wolf, described by the Navy as "the last word" in its line, will be built from a design developed by Chance Vought Aircraft Division, United Aircraft Corporation. The new powerfully armed and well armored plane, whose prototype was the Chance Vought XTBU-1, will be mass produced by Consolidated Vultee Aircraft Corp. at Allentown, Pa. The Sea Wolf was described as "eight tons of fighting power," carrying a crew of three, pilot, gunner, and radioman-bomber, by Admiral Ralph Davison, Assistant Chief of the Bureau of Aeronautics, in his address at the dedication of the Convair Field adoining the Allentown Convair plant. While performance figures of the Sea Wolf, its speed, range and ability to climb, were not disclosed, Admiral Davison stated that "there is no other torpedo plane in the world today to match it."

WPB Explains Restrictions to Texas Operators

WPB Order P-47 and Application Form 1747 enabling private plane owners to get parts and necessary supplies were clarified by WPB officials at a meeting held in Dallas in November. Presided over by Bob Kenty of Air Associates and Bob Millsap of Co-operative Flying Service, the meeting was attended by about 125 people, a cross section of aviation in Dallas and Ft. Worth. Ed Schwille and George McBlair of the WPB spent three hours answering the many questions, and assuring the group that WPB was there to assist them in every respect.

Buckley New Manager of Timm; Gliders Dropped

R. B. Buckley has been appointed vice president and general manager of Timm Aircraft Corporation of Los Angeles and Van Nuys, Calif., succeeding J. A. Mitchell, who resigned. Timm is manufacturing Aeromold Tutor N2T-1 trainers for the Navy and various metal parts and fabrications for various types of combat planes. The company recently halted production of Waco CG-4A troop carrier gliders because of the manpower shortage on the West Coast.

Postwar designs for a new "Aeroncar" are now being made by Peter Altman, consulting engineer for Aeronca Aircraft Corporation, Middletown, Ohio. From left to right, are: Ed Burn, director of research, Carl Friedlander, president, Peter Altman, W. D. Hall, chief engineer, Elmer Sutherland, vice president, Al Helmers, secretary-treasurer, all of Aeronca.

WTS Orders Replacement Engines from Aircooled Motors

Aircooled Motors Corporation recently announced receipt of two new orders for Franklin aircraft engines for primary training planes, one from the Brazilian government and the other from the War Training Service. It was revealed that the Brazilian government has ordered a quantity of Franklin 65-hp, horizontally-opposed, aircooled engines to power military training planes. The WTS order included the Franklin 65-hp engine, similar to the Brazilian engine, and the Franklin model 4AC-99-E3, a 90-hp model, the two engines to be used for replacement purposes in primary training planes. It was emphasized that these new orders are in addition to production of other Franklin engines for the Army Air Forces.

Conference at Amarillo

Speakers at the Southwestern Aviation Conference, Herring Hotel, Amarillo, Texas, December 7-8, were scheduled as follows: C. I. Stanton, administrator, Civil Aeronautics Administration; Don Valentine, director, public relations, Cessna Aircraft Co.; Chas. E. Beard, vice president, Braniff Airways, Inc.; L. C. Elliott, CAA Regional Manager, Fort Worth; S. E. Travis, CAA Regional Engineer, Fort Worth; John Wilson, executive director, National Aviation Training Assoc.; E. C. Dodd, educational consultant, CAA; Jack Frye, president, Transcontinental & Western Air, Inc.; Chas. Gallon, assistant vice president, TWA; Tom Braniff, president, Braniff Airways, Inc. Rex B. Baxter, manager of the Amarillo Chamber of Commerce, which arranged the Conference, described it as a "purely educational" meeting, with everybody privileged to participate in discussions.

Fleet Heads Institute

Reuben H. Fleet has been elected president of the Institute of the Aeronautical Sciences for 1944, succeeding Dr. Hugh L. Dryden, National Bureau of Standards. Major Fleet, formerly of the Army Air Corps, organized Consolidated Aircraft Corporation, and was president of the company until 1941, when he sold his interest to Vultee. Fleet now serves as consultant to Consolidated-Vultee Aircraft. An annual meeting of the Institute, which is composed of 5,500 aeronautical engineers and scientists, is scheduled for January 25 at Columbia University.

40th Wright Flight Anniversary

Observance of the fortieth anniversary of the Kitty Hawk flight by Orville and Wilbur Wright will be held on December 17 at Kitty Hawk, Kill Devil Hill, N. C., and in Washington, D. C. Committees handling details of the North Carolina observance are headed by State Representative Herbert Bonner, state committee, and Sheriff Victor Meekins, Dare County committee, Governor J. Melville Broughton, North Carolina, announced recently. President Roosevelt will speak at the Washington observance, which Orville Wright plans to attend.

It's Still "Friendly Transportation"

★ In a 1939 message to employees, T. E. Braniff, president of Braniff Airways, said: . . . "It is the natural friendliness of the Southwest, an outcropping of the heritage from our pioneer fathers, the wish to be a good host, which has caused our guests to comment so favorably through the years. It has led us to the adoption of a phrase, coined by a passenger, who complimented us on our 'Friendly Transportation'."

★ War is a grim business . . . but we of the airlines can't help feeling that human relations are even more important today because of it . . . that a smile helps lighten the load for wartime travelers. That's why passengers Southwest with Braniff still call it "Friendly Transportation."

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Aviation's Future Rests With Cowpasture Pilots, Not Airlines—Johnson

What will be aviation's greatest future stimulus? This question was answered by Lt. Col. Earle L. Johnson, Civil Air Patrol National Commander, in an address featuring a mobilization of the Oklahoma Wing last month. Said the Commander:

"When anyone wants to know what will make aviation in the future, there's only one possible answer—citizens; citizens who own, operate and fly their own planes will boost aviation in the future just as citizens' purchases of automobiles built the automotive industry. Airlines will not buy enough airplanes after the war to keep factories operating on their present scale for one month, even if the airlines expand 1,000 per cent. The future of aviation depends on the puddle jumpers and the cowpasture airports, not the major airlines. They are but mergers of a bunch of cowpasture pilots. And in the future the cowpasture pilots will continue to pave the way for aviation development."

Sixteen Wings were represented at the Oklahoma mobilization by commanders or staff officers. Major Moss Patterson, head of the Oklahoma Wing, presided as host. Major Bill Green of Tulsa reviewed activities at a Coastal Patrol Base he commanded and Josh Lee, Oklahoma's member of the CAB, also spoke.

(Photos by Capt. Chester Wills, Oklahoma Wing Photo Officer.)

SIXTEEN WINGS were represented at an Oklahoma mobilization held last month at Oklahoma City. Part of the assembly is pictured at top. Below, left to right, are Major Moss Patterson, Oklahoma Commander and host; Lt. Col. Earle L. Johnson, National Commander, who outlined scheduled expansion of the CAP, and Maj. Bill Green of Tulsa, who reviewed activities at a Texas Coastal Patrol Base he commanded until recently.

ATTENTION!

After months of preparation we are happy to tell you that the new 1944 CAP HANDBOOK will be ready for distribution shortly after Christmas. Frankly, this preparatory work has taken longer than we anticipated. But we are confident that when you see the Manual you will feel that it is well worth waiting for. Please know that your patience is sincerely appreciated.

Copies of the HANDBOOK will be sent FREE to all CAP members who have entered new two-year subscriptions, or who have extended their present subscriptions for two years in accordance with our special offer.

PLEASE NOTE:

Effective with this issue, the CAP EDITION and the REGULAR EDITION of SOUTHERN FLIGHT will be combined. The new 1944 Handbook will replace the former Inserts as a source of CAP information and will be included as a regular part of two-year CAP subscriptions. Starting with the January, 1944, issue, all CAP news will be carried in the regular edition.

CAP Gets 288 Army Planes; Operations on West Coast Launched

Distribution of 288 Army grasshopper planes to Civil Air Patrol Wings was inaugurated around December 1 as the CAP intensified its growing Aviation Cadet recruiting campaign. In one week 110 Taylorcraft L-3's were rationed out among the forty-eight Wings. Wings receiving Taylorcrafts in the first go-round included Texas, which got six, Oklahoma four, Pennsylvania six, Rhode Island two, South Carolina four, South Dakota three, Tennessee four, Arizona four, California four, Colorado four, Idaho four, Montana three, Nebraska four, Nevada four, New Mexico four, and Oregon four. They are to be followed by more Taylorcrafts and a number of Aeroncas, with individual Wing membership and activity determining the number to be received. All the planes, said Lt. Col. Earle L. Johnson, Commander, are "brand new."

The allocation of Army aircraft to the CAP was one of several events highlighting the second anniversary of the organization's founding. Flying activities, said Col. Johnson, "are undergoing expansion in order that our planes and pilots may be of maximum service in relieving military equipment and their crews for combat duty." Details were

(Continued on page 76)

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By TONY HAGMANN
Field Representative

★

Dallas . . . Do you remember . . . Love Field in '26? Didn't Herb Kendricks fly out some of the first airmail? Remember when Lou Foote's home was where the Administration Building is now located . . . and Johnny Morriss sent out a plow to go over the field to smooth it down? Was it in '28 that Love Field got *real* runways? And was it in the 30's that Bill McConnell bought and flew a Pilgrim? . . . Remember when "Doc" Booth started what is now Southwest Airmotive? . . . When Hal Henning joined up? . . . When Killingsworth and Les Bowman did, too? . . . Didn't Tom Hardin fly the first weather? Then Murral Brock?

Couldn't you find Charlie Pedley, Garza Wooten, B. B. Owens, Pop Turner, or Howard Woodall in Johnson's cafe, maybe having a cup of coffee and doing some hangar flying? . . . Remember the *new* planes . . . cabin jobs? When Al Henley might come in, or A. J. Langford . . . maybe in a Swallow? When Bub Merrill, now Major Merrill, AAF, flew for American . . . and Bennett Aircraft? When Frank Say joined the gang? When Seth Barwise got the first airmail contract and didn't believe it was true? When Byron Good ran the field . . . year after year?

Remember when Jack Miller had three planes burn up in the new hangar back in '29? Weren't they Flamingos? . . . When Major Bill Long set up shop? . . . When Reg Robbins and his partner made the world's endurance over in Fort Worth? . . . When A. T. Barrett fathered so much activity in aviation, helping to start SOUTHERN FLIGHT, too? . . . When Tom Hardin worked for Texas Air Transport in '29 . . . one of the first airlines? And then C. R. Smith joined up?

Remember when Temple Bowen ran a mail flight between Dallas, Waco and San Antonio? . . . When Bill Fuller came over from Ft. Worth to swap flying news with the boys? . . . When Braniff Airways, back in '31, made their first flight from Oke City? . . . When in '38, Nichols Beazley started a supply shop and Air Associates bought him out? . . . Gosh, do you remember the "good ole days?" . . . Hamburgers and beans!

Beaumont . . . Jimmy Marshall has set up business in these parts, sellin' and buyin' planes, boostin' Culvers . . . sounds like old times. We also hear that a new flying club has been started with C. B. Locke as president. Members are all private parties who want to fly for the war effort or postwar business or something. Joe Mabry, Mary Ellen Dunshie, Mrs. Helen Dowell, William Farcette, Lt. L. W. Bramlett, Bob Ohmsted, E. M. Harrison and Wilber Womack are directors of the new club. They have a total membership of twenty members according to George Clay, who gave us the dope on the deal. Shore sounds good to hear about a new flying club.

Special announcement . . . No. 1—Leon McKennon, Southern Representative of the Irving Air Chute Co., told us that there was only one way to jump out of a plane and that was to *crawl* out. He also said that you should clear your plane, pull the rip cord, and land relaxed. You do not lose your facilities falling through the air, so don't tighten up. Always go head first, less danger of being hit on the noggen and being k.o.'d. Remember how you used to jump off a fence . . . knees lightly bent . . . ready to tumble? That's the deal. Leon said he hoped you never *had* to use one, but for gosh sakes, take care of it, just in case.

Special announcement . . . No. 2—the Southwest Aircraft and Accessories Exposition, posted for spring, will be a show of postwar planes, equipment and paraphernalia. National invitations will be extended and you'll hear more about this later. It will be held in Dallas.

Bryan . . . According to Nan Brigs, the Cardwell Flight Academy has a gal instructor from N. Y. named Elizabeth Peck. She usta teach this here aviation business at Lime Ridge Airport up yonder, and is a fair dish . . . A. D. Limouze and C. W. Carter teach the gang Meteorology and Navigation twice a week. E. B. Germany, Buck Rowe and C. Hobson Dunn were visitors to this thriving little airport, where there were students from every state last month, and one from Mexico . . . Some business, aviation! Oh, yes, Guy Denton and Bill Wilson bought a flyin' machine and are huntin' a bigger one.

From Marion Melchor, Kansas City, Mo.—We hear that October and November were months of activity! W. B. "Bill" Stout spoke

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here. November 10th and 11th the Air Traffic Conference of America was held in Kansas City. Twenty-two airlines sent traffic representatives and other executives, Canadian and Alaskan as well.

Many officials of the city's aeronautical interests treked on down to Oklahoma City to join the Postwar Planning Conference held there. . . . November 23rd marked the Heart of America Air Service Conference. This, too, was arranged by the aviation department of the Chamber of Commerce and brought together interested persons or groups from Oklahoma, Nebraska, Kansas and Missouri. They met with representatives of thirty-two air transport organizations now operating or proposing to function as air carrier systems in this trade territory. The speakers included: J. W. Miller, president of Mid-Continent; T. E. Braniff, president of Braniff; E. Lee Talman of TWA; W. H. Reed, secretary and counsel of Consolidated. A demonstration of airmail pickup closed the conference.

This is unusual! Instead of making speeches, the city officials took an aerial view of the completed auxiliary municipal airport—Grandview—nodded their approval of the fine work—and flew back to town in some twelve minutes.

Handsome Otis F. Bryan is now a Major and can be addressed in care of Uncle Sam at Washington. He, you may remember, flew President Roosevelt over the land routes to and from the historic Casablanca conference. Women made news with the Air WAC recruiting program. Leading civic organizations were sent telegrams on Armistice Day when Maj. General F. E. Uhl of Omaha headquarters urged the presidents to meet on November 13th at the city hall. The man with the seven-league boots, Lt. Col. Charles W. Kerwood (whose campaign ribbons reminded me of the chap who commented on a similarly beribboned personage that "It's plain to see you've never had a peaceful moment!" and young Lt. Mark Treat, returned recently from combat flying in the Pacific, addressed the meeting. Col. Kerwood impressed his audience with the fine work of the WACs on foreign battlefields. The Kansas City Unit of the Women's National Aeronautical Association is participating in the recruiting drive, as are the officials of the local CAP squadrons. . . . A Kansas City gold-star mother found solace for her personal grief by painting a mural 8½x23 feet, depicting her son "Gil", a Lieutenant in the Air Forces who trained at Randolph and was fatally injured last May. This inspirational mural became a part of the Officers' Club at Randolph Field last month, and Mrs. Mignon Worley was there for the dedication.

Piper Offers Kit for Classroom Instruction

The Piper Aircraft Corporation, Lock Haven, Pa., is offering a "Piper Teacher's Kit for Junior Aviation Instruction Material," to promote aviation instruction in American schools. The kit includes six large wall charts, prepared by Piper engineers and approved by industrial arts instructors and school superintendents.

Bowser Simplifies Name

S. F. Bowser & Company, Inc., have changed their name to Bowser, Inc., for brevity and to conform with the name by which the company's products are most commonly known. No other changes in the corporate status were made, Harry J. Slack, advertising manager, stated.

CIVIL AIR PATROL

(Continued from page 74)

not given, but he added that "some shifts in our flying assignments have taken place" and revealed that operating bases are being set up on the West Coast where flying heretofore had been prohibited. New bases soon will be activated in other areas.

Cadet Recruiting Greatly Expanded to Aid Air Forces

Expansion of the Civil Air Patrol's Army Air Forces Cadet Recruiting Program into proportions of six figures has been announced, with each of the forty-eight Wings intensifying efforts to sign up boys of sixteen or even fifteen years of age to take mental and physical aviation cadet exams when they reach seventeen. After the exams they will be trained by CAP for another year before being called to active duty at the age of eighteen.

Highlighting the drive is an innovation originated by the Texas Wing—the organization of entire schools for cadet training. New York is preparing to do the same thing. Reports indicate there are cadet units in each of the forty-eight Wings and a substantial majority of the local units of CAP at more than a thousand points have enrolled cadets. Thus the CAP has already established a pool of over 40,000 potential cadets for the AAF.

Army and CAP Leave Coasts as Navy Takes Over Anti-Sub Patrol

The War Department announced on November 10 that the Navy has assumed full responsibility for anti-submarine patrol operations along the coasts of the nation. No mention was made of the Civil Air Patrol's anti-submarine operations, but since CAP is an auxiliary of the Army Air Forces, which had responsibility before the Navy took over, it was assumed the CAP had also ceased its anti-submarine project. The Army's anti-submarine command, activated in Octoberr of 1942, had operated on a world-wide scale, fighting U-boats in three different theaters of operation.

Girl Scouts in Aviation

The Horizons Club, senior high school Camp Fire Girls, recently completed an aviation study entitled "World Horizons," embracing all phases of aviation today and in the future, and one aviation "log" was awarded a silver plaque by National Aeronautic Association. The project included study of construction and performance of planes, aircraft identification, air-age forums, charting of world air routes, studies of foreign lands, people and their culture, and new businesses and careers in the future as a result of aviation. Gill Robb Wilson, president of NAA, congratulated the Horizons Club girls on their project, saying they had made a "definite contribution to the aviation picture."

Air Trip Offered Students

Southern Airways has offered an award to the outstanding student in preflights aeronautic classes in Birmingham and Jefferson County (Alabama) high schools of a cross-country flight from Birmingham to Southern Airways' operation in Decatur, Ala., Southern Aviation Training School, where the 65th AAF Flying Training Detachment is stationed The winners, the outstanding students in each of the classes at the close of the school year next spring, will be entertained by the Primary School and flown back to Birmingham in the afternoon. Frank W. Hulse, president of Southern Airways, stated that the offer is to further interest in preflight courses.

The Local Air Service Conference at Kansas City, Mo., held on November 23, was attended by representatives of the airlines and prospective carriers. Among those attending were, left to right, seated: Alden B. Woodbury, vice president, Parks Air College; E. Marion Johnson, director of planning and research, Delta Air Corp.; E. Lee Talman, executive vice president, Transcontinental & Western Air, Inc.; Terrell C. Drinkwater, executive vice president, Continental Air Lines, Inc.; standing, left to right: S. W. Fordyce, III, assistant to the president, Kansas City Southern Transport Co.; Frank N. Buttomer, director of research, Mid-Continent Airlines, Inc.; Harry R. Stringer, vice president, All American Aviation, Inc.; Charles E. Beard, vice president, Braniff Airways, Inc.; W. Haley Reed, secretary and counsel, Consolidated Air Lines, Inc.

Kansas City to Hold Airport Meet in January

Because its recent "heart of America local air service conference" last month, Kansas City has scheduled another conference on the subject of airports for some time in January, according to Richard C. Murray, aviation commissioner of the Kansas City Chamber of Commerce.

The air service conference was attended by 310 people. Ninety-two towns and cities in the Kansas City trade territory were represented, out of a total of 135 such cities invited. All cities were on proposed air routes. Incidentally, there is a total of ninety routes proposed by twenty-five operating and prospective air carriers, proposing additional air service for Kansas City and the area. In addition ten other prospective carriers have filed applications, or indicated intention of so doing, for unscheduled routes.

Air lines participating in the conference included: Braniff Airways, Inc., Continental Air Lines, Inc., Delta Air Corporation, Mid-Continent Airlines, Inc., Transcontinental & Western Air, Inc., and All American Aviation, Inc. Prospective carriers having applications for routes in the area and participating in the Conference were: Eagle Air Lines, Inc., St. Louis; Consolidated Air Lines, Inc., Kansas City; Kansas City Southern Transport Company, Kansas City; Parks Air Transport, Inc., East St. Louis, and Automatic Air Mail, Inc., Lost Nation, Iowa.

Weather Rules Liberalized

Regulations governing transmittal of weather information in code have been lifted so that all airway stations are now permitted to give pilots complete data for a limit of two locations per contact.

BOOK REVIEWS

This Exciting Air, *by Boone T. Guyton, published by Whittlesey House, McGraw-Hill Book Co., Inc., New York, price $2.00.*

This book is Guyton's own story of how and why he became a test pilot, and why he stays with the dangerous business of flying new designs and types of planes and putting them through all the punishment and checks possible.

Physiology in Aviation, *by Chalmers L. Gemmill, B.S., M.D., published by Charles C. Thomas, 220 East Monroe St., Springfield, Ill., price $2.00.*

This small text contains essentially the material given in lectures on physiology at the School of Aviation Medicine, Naval Air Station, Pensacola, Fla. The author, a commander in the Medical Corps, USNR, intends for the book to show all aviators the importance of "the man in the plane" as well as the "characteristics of the plane." One chapter on "Instrument Flight" was written by Lt. Frederick B. Lee, USNR.

Dictionary of Science and Technology in English - French - German - Spanish, *by Maxim Newmark, Ph.D., published by Philosophical Library, Inc., 15 East 40th Street, New York, N. Y., price $6.00.*

Compiled over a period of eight years, and brought up to date to include terms of latest development in aviation, radio and television, this comprehensive volume is designed for foreign language reading in science and technology, and is intended principally for reference work for technical and engineering libraries. The dictionary includes 10,000 terms in English currently used in the scientific and polytechnical field.

An Aeronautical Reference Library, *by Willard Kelso Dennis, published by Special Libraries Association, 31 East 10th Street, New York City, price $1.10.*

A compilation of 800 titles for an aeronautical library, with prices, publishers and authors of each. This booklet of thirty-two pages is a quick reference for library and research workers, and the price ($1.10) includes postage and handling.

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